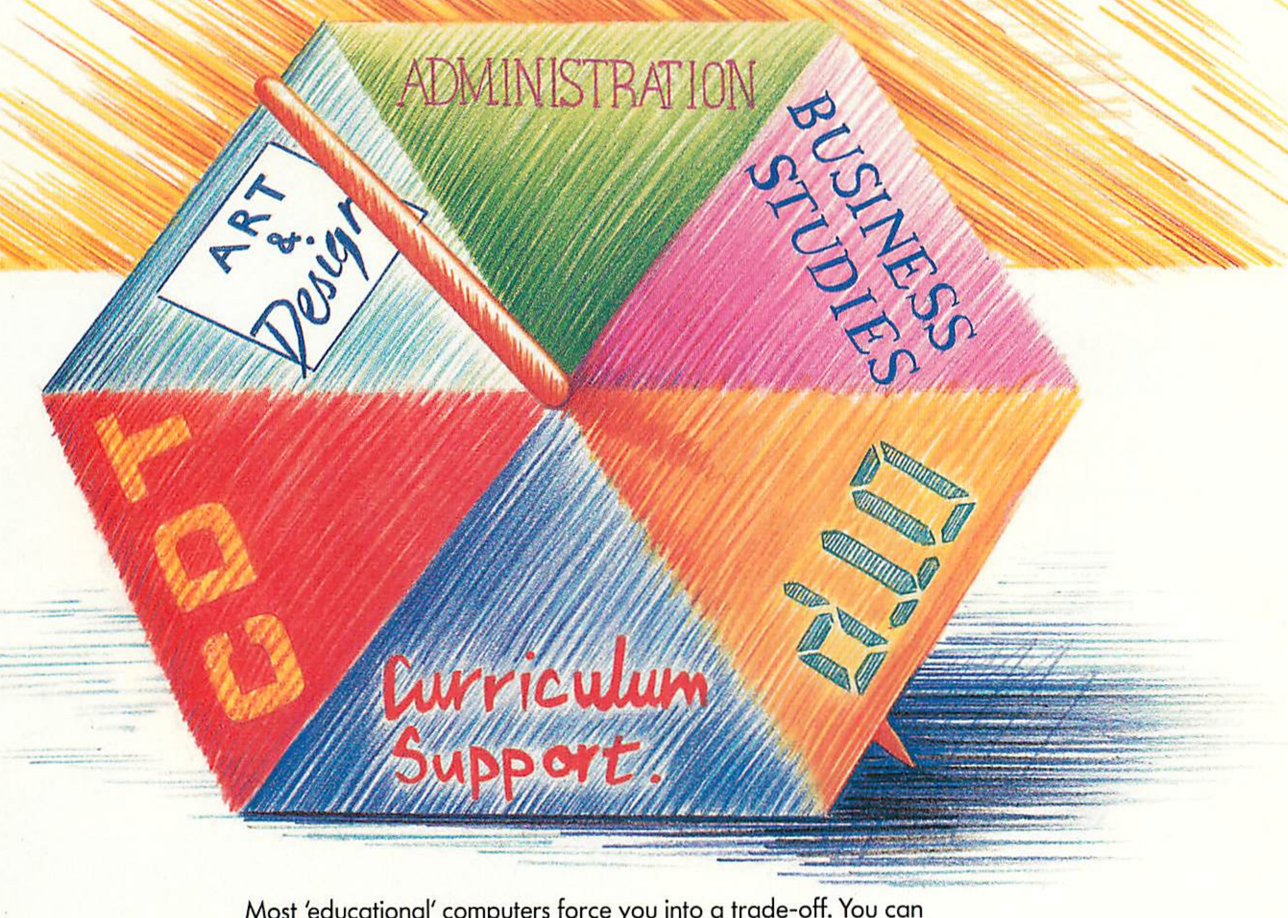

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The RM Nimbus is on everybody's side.



Most 'educational' computers force you into a trade-off. You can have high speed – and very little software. Or slick DTP – on a screen like a letterbox. Or business roots – with little interest in education's special needs. (You can guess which machines we're talking about.)

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Our Transitional Support Programme means that you can keep your bank of programs in BBC Basic.* PC compatibility gives you MS-DOS.* High-powered Nimbuses can run OS/2* or UNIX.* In short, we combine the riches of the main software traditions of the past, the present and the future. No wonder 90% of 16-bit computers in schools and colleges are Nimbus micro computers.

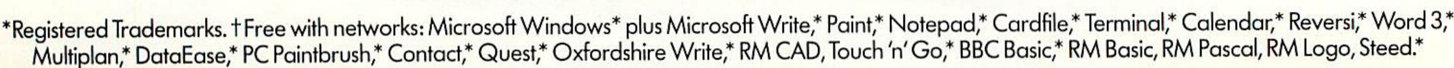
If your school installs a Nimbus network, much of this software is supplied free.† In fact, RM's list of *free* software is almost as long as some machines' list of *available* software.

Rather than one virtue – the Nimbus has many. Too many to list here. For more about the great all-rounder, contact us either at Oxford on 0865-791234 or Stockport on 061-477 1538, or write to Research Machines, Mill Street, Oxford OX2 0BW.





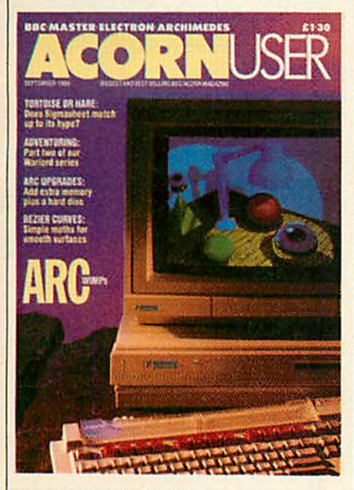




ACORNUSER

ISSUE No 74 SEPTEMBER 1988

COVER



COVER FEATURE

Easy WIMPs on the Arc, pages 56 to 63

Cover by Nick Dicks, screen from Clares' Graphics and Sound demo disc

EDITORIAL

The BBC micro world is about applications – real people doing real things. At *Acorn User* we're all too aware that practical things like printers cause lots of problems. And to solve these problems, a helpful dealer is a must.

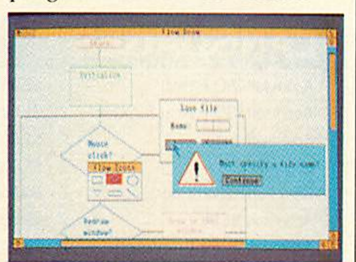
Too many dealers are interested simply in selling stock. Too many buyers aren't prepared to pay the slightly higher prices that dealers offering a real service have to charge. If this persists, everyone ends up with cheap hardware that no-one knows how to use.

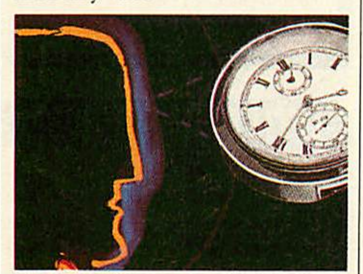
Acorn are trying to alter this. Dealers are expected to attend specialist training courses, which are free – so there's no excuse. And buyers must support really helpful dealers with their cash.

At *Acorn User*, we'd be interested to hear of any experiences, good or bad, that you've had with your dealer.

NEWS

FEATURES





REVIEWS

EDUCATION

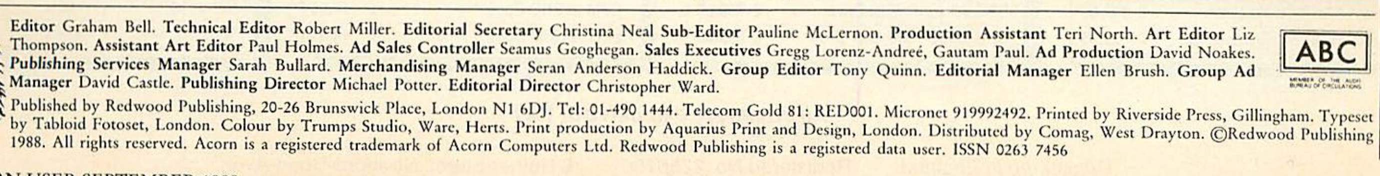
REGULARS



NEXT MONTH

Back to school with *Acorn User*. Plus a History of Acorn, Joe covers 'thought processors', we review *Pipedream*, and a Polyominoes type-in game

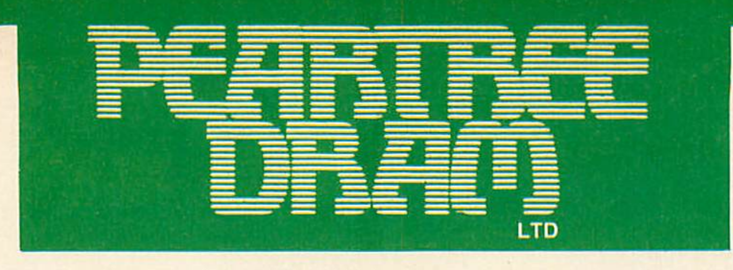




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Published by Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Tel: 01-490 1444. Telecom Gold 81: RED001. Micronet 919992492. Printed by Riverside Press, Gillingham. Typeset by Tabloid Fotoset, London. Colour by Trumps Studio, Ware, Herts. Print production by Aquarius Print and Design, London. Distributed by Comag, West Drayton. ISSN 0263 7456





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NEWS



Arc program in C computer language handles Japanese with ease

Concepts puts ARM into PCs

Computer Concepts is to use Acorn's ARM chip set in a laser printer card for the IBM PC. The product will be announced at September's Personal Computer Show and will be the launchpad for an ambitious office system.

The plan is to bring the power of the chips in the Archimedes to the millions of PCs already sold and use it to run a desktop publishing package which will also be on show. Another card can be added for sending messages over the phone by fax and controlling a scanner to get graphics into the DTP system.

Computer Concepts has already announced an alternative operating system for the Arc called Impulse (see June), and has applied for approval of the fax card, which will also be versioned for the Arc.

The laser card will come with Concepts' own *Postscript* clone, a version of the software from US-based Adobe, made famous by Apple's laser printer for the Macintosh. This can turn a document into a form which can be handled by the printer.

The laser card uses its *Postscript* clone to control output to the screen as well as the printer.

Concepts boss Charles Moir compared the style of the windowing environment to *NeWS*, the Sun network windows system, although it won't be compatible. Acorn is thought to be working on *NeWS*-compatibility for running the Unix operating system on the Arc.

Prices for the PC ARM card, which includes 4Mb of memory, have yet to be fixed, but a system for the PC consisting of the two cards with laser printer and scanner is expected to cost about £4,000.

BT shows off translation first on Arc

British Telecom is using the power and graphics of an Archimedes 440 to demonstrate its speech translation system.

The futuristic system, which is designed to accept speech in English and translate it automatically into French, German, Spanish, or even Japanese, is at an early stage at BT's Martlesham research labs in Suffolk.

The package is being developed on BT's own Merlin PC computers, but the Arc is being used to display the text being translated.

Project leader Martin Steer said: 'We are using an Archimedes 440 and Microvitec multisync monitor for display demonstrations with the actual translation on a PC. The Arc is used as a graphics system because of the font capabilities.

Star enters 24-pin race

■ Star is expecting its new LC24-10 dot-matrix, which boasts 24 pins and four built-in typefaces, to be a best seller at about £400. Meanwhile, Brother is not expecting to be hit by the European tax on imports as its machines are made in Wales.

■ Works of 27 artists using computers are being displayed in Middlesbrough's Cleveland Gallery until September 17.

■ Utilities to extend the graphics capabilities of ISO Pascal on the Arc cost £30 from Smith and Wiggins.

■ Computer Spares has a 5.25-inch disc drive interface with power outlet available for £55.20 on the Arc without a podule backplane.

■ Acorn will be showing 'new advanced fileservers for ARM-based products' at Econet '88. Resource is organising the two-day conference at Newman College on September 12-13.

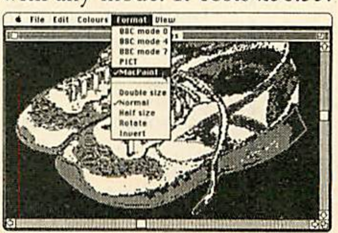
■ *Stop Press* publisher AMS has been taken over by Logitech, who makes the AMX mouse.

■ Bridlington Computer Club is organising a computer show at the town's Leisure World complex on October 7-9.

■ RSA has introduced an Information Technology qualification which can be taken in three stages at work.

■ Drage and Evans of *Acorn User* fame have got a book coming out called *Teacher Friendly*. The publisher is LDA and it costs £14.95.

■ HCI has followed up its *View* to Macintosh utility with *Screen to Mac* which can cope with any mode. It costs £56.35.



BBC trainers on Mac screen

Internal modem on the way

Beebug's modem which fits inside the Master is at last approved for connection to the phone system – and there's one for the Arc on the way too.

The £119 Master device offers 1200/75 and 300/300 baud rates for connecting to Telecom Gold, Prestel and bulletin boards.

Software is included, which comes on disc for sideways RAM, and in a chip. It supports auto-dial and routines are provided for auto-answer as a star command and what the company calls a 'skeleton bulletin board program,' which goes by the name *Ghost Host.*

Beebug's Arc modem – which is Hayes compatible – will be done as a standard expansion board. It's already being tested internally, and is set to go off for approval.

Hearsay, the Arc comms software – which should be out this month – costs £69, and is controlled by a mouse with a WIMP screen. It mimics several terminal systems including VT100, VT52 and viewdata, and supports Kermit and X-modem protocols.

The Master modem comes as a board measuring about 19cm by 5cm which slots into place between the main board and the power supply, where many Masters have their battery pack. (To make room for the modem, this has to be changed by a dealer for the new version which sits at the left of the keyboard, and costs £3.69).

There are three leads, two to the Master main board and one to the phone socket.

Pipedream extra

Colton Software is working on a spelling checker for *Pipedream*, its spreadsheet with wordprocessor package for the Arc and PC-compatibles.

The checker will come up as a menu option in *Pipedream* and is claimed to be running through 42,000 words per minute on an Arc. It can check as you write or go through a file afterwards using a dictionary of 80,000 words.

Art for Arc

Mike Williams, who readers may know through his pixel editing programs in *Acorn User*, has started up his own company with a mode 12 art package for the Arc called *Leonardo.*

As well as the expected functions, there are zoom and undo options. *Leonardo* costs £17.50 from Beard Technology.

Changes in the Pipeline

Superior has started lining up its autumn games with *One Night in Bangkok*, and leading up to *Exile*, which the company sees as 'dominating the Christmas market'. However, because of the Piper Alpha tragedy in the North Sea the scenario has changed for its *Pipeline* game, which was based on an oil rig disaster.

Bangkok features two hit songs from the *Chess* musical. These are built into an arcade adventure with isometric 3D views of chess boards featuring in the puzzles. This will be for the BBC and Elk.

Exile comes from the keyboards of Peter Irvin (*Starship Command)* and Jeremy Smith (*Thrust*). It is claimed to be 'far beyond' any BBC game in animation and map size, and a 'true programming work of art.' An Electron version is planned to follow the BBC release.

Pipeline is having the plot reworked to be set in a mining operation on a jovian moon, and should still make a September release. *Bangkok* should beat it into the shops with *Exile* following for Christmas.

New games for the Arc are still under wraps, but are said to be a *Repton* clone, and two others in the style of *Elite* and *Arkanoid*.

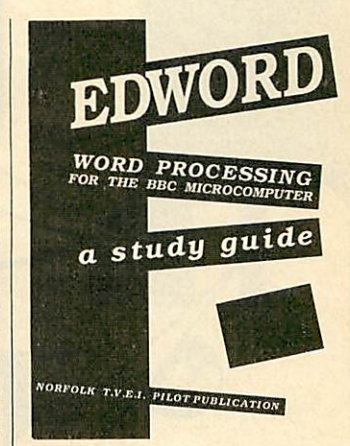
Adviser trainers turn to magazine

Hundreds of new teaching advisers are being trained in information technology using articles from *Acorn User.* It's all part of a £10 million goverment scheme to further the use of micros across the whole school curriculum.

The chosen teachers will be on call to schools from the start of the new school term.

Courses will train teachers to become subject advisers, and MESU, the technology support body for schools, is producing the support packs. These will include classroom materials, examples of good use, and background reading.

Two packs using articles from *Acorn User* are those for craft, design and technology (which also carries Joe Telford's circuit design software from last December on disc), and maths.



Just out

Norfolk *TVEI* centre has produced a series of guides on popular wordprocessors, including *Edword* and *View*. The 16-page booklets are sold in packs of 10 for £15.

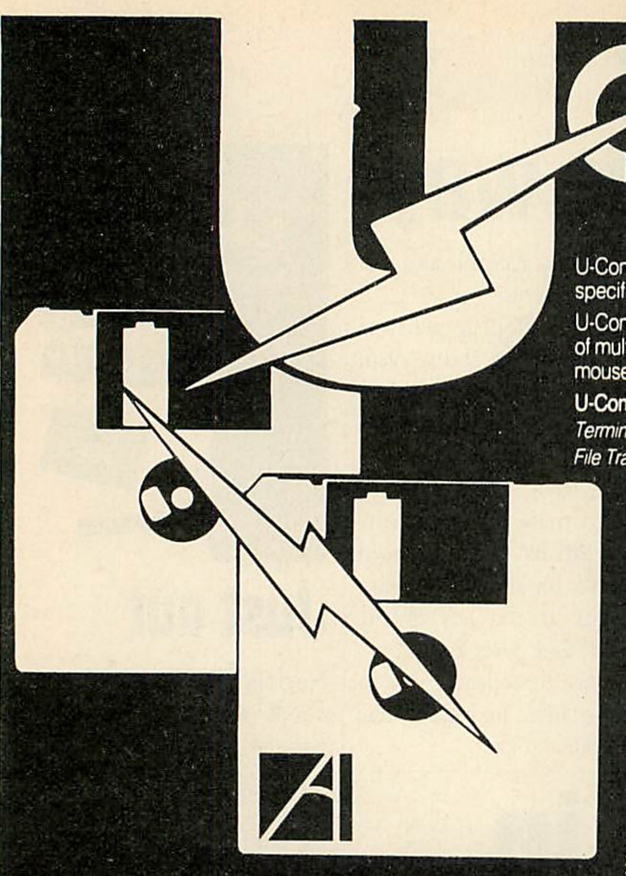
With World Food Day coming up on October 16, the release of **What Do We Eat?** by the Centre for World Development education is nicely timed. It encourages children to analyse their food and compare it to other countries. It costs £18 for a 40-track BBC disc. The Centre also has a **World Development Database** for *Grass* and *Quest* also costing £18.

Learning electronics at GCSE level and upwards should be improved with **Understanding Transistors** from Computer Aided Training. A £39 box of tricks links to the BBC for investigations with diodes, capacitors, transistors, a speaker and resistors.

The Wizard Strikes Back is an adventure from Cambridgeshire Software House for primary education. Also, the Nimbus spreadsheet **PSS** has been converted for the BBC and Master.

Granada's 1988 catalogue contains several titles, including **Key** datafiles on acid rain and a city census, as well as a publishing package for primary schools called **Deadline!**

The Shell Centre's BBC **Compose** package is being versioned on the Archimedes for release in September.



U-CONNECT

Communications Software for Acorn Archimedes computers

U-Connect is a general-purpose, but full-featured communications software package written specifically for the Archimedes range of computers, using a combinations of assembler and 'C'.

U-Connect runs exclusively within the Archimedes WIMP environment, fully utilising the concepts of multiple windows, icons, and pop-up menus to provide an easy-to-use, flexible, and attractive mouse-driven package.

U-Connect provides:

Terminal Emulations – Teletype, VT52, VT100 and VideoTex (Prestel)

File Transfers – ASCII, X-Modem, Kermit, CET (Prestel Download)

Screen Review – view past text/frames in separate scrolling window.

Modem Drivers – support for all common types of modems, fully user configurable (Hayes, Dacom, Pulsed, and Dumb supplied as standard).

PhoneBooks – Multiple phonebooks allowed, each with 40 entries, defining phone numbers, logon, function keys etc., allowing the complete environment to be pre-configured automatically before connection.

U-Connect is ideal for the Archimedes User who wishes to connect to remote computer services, such as Bulletin Boards, Online Databases, Conference Systems, E-Mail systems etc. It is supplied on 3.5" disk, with a comprehensive user manual covering all aspects of the package.

U-Connect is the first in a range of Magenta Research software packages planned for the Archimedes over the coming months.

Price: £59.95 inc VAT & p+p (outside UK add £4 p+p) Send cheque or PO to:



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Computer skills for nurses

Nurses and midwives will soon be learning computer skills on Masters as part of a nationwide project worth £500,000 to set up eight computer-assisted learning centres.

The project is the first stage in setting up a full syllabus for information technology training, expected to be introduced for all nurses in 1989. Two dealers, 3SL in Cheshire and Simnetts in Surrey start installing the equipment this summer.

On show at a recent health-care exhibition were applications using Wild Vision image processing equipment for analysing movement and for medical scanning. And the Arc with Watford's video digitiser was the subject of a one-day presentation at the Institute of Opthalmology.

1m dollar BBC boost

Sponsorship and a million dollar grant from a charitable trust is to boost the BBC's output of interactive video materials.

Two IV discs – which contain thousands of still or moving pictures which can be mixed with computer graphics – are being mainly funded by money from outside companies. These will run on the revolutionary Master-based Domesday system.

First will be the *Countryside* disc. The costs – reckoned to be £300,000 with modelling software from Logica costing £50,000 alone – are being met by a variety of bodies, including the Nature Conservancy Council and the National Farmers Union.

The second is about the City of London, and has the Mayor's office itself and US financial house Citibank as sponsors – both to the tune of over £100,000.

But the biggest input to the BBC's Interactive Television Unit has come from the Markle Foundation in New York. The BBC has been given the cash to spread the IV word, as the foundation exists to encourage 'communication'.



Taking some of the 1600 stills needed for the BBC *Countryside* disc

Peter Bratt, deputy editor of the unit and producer of the *Ecodisc* (see May review) explained: 'All the funds for discs have to come from sources other than the licence fee, and for that we're very grateful to our sponsors who believe in the importance of this medium.'

'The Markle Foundation has given us $1m over two years – the first time it's ever given so much money at once.'

'The *Countryside* disc will cover the rural economy and society,' said Bratt. 'That includes farming, insecticides, the environment, conservation and ecosystems, as well as rural society and economy.'

The second disc 'will cover the City of London from Roman times up to the present,' said Peter, 'and seeks to explain what the city is, and what it does.'

A team of people is being set up to pool expertise developed on the Domesday system as well as *Ecodisc* and *Volcanoes*. These people will act as information providers on the technology and software techniques of interactive video.

Clares to expand Artisan

Clares has brought out a printer buffer module for the Archimedes and is set to release an upgrade of the *Artisan* package. The buffer includes a printer macro utility and costs £19.95.

The company is tight-lipped about developments but will admit to focusing on picture manipulation in a professional version of *Artisan* and broadening its client base into advertising and broadcasting.

Part of the Mandelbrot set

Star of the show

Steven Streater's program to generate pictures of the Mandelbrot set – a version of which was carried on May's *Acorn User* Archimedes listing disc – was the star of a symposium on fractals in Holland.

Students at Delft University organised the meeting and were honoured by the presence of Dr Mandelbrot himself. He gave away an Archimedes to the winner of a competition to find the most beautiful fractal.

Wouter Kolkman, of Dutch dealer Eeckhorn Computers, explained: 'There was a great deal of interest in the Arc and it was the ideal audience to show the machine off to'.

TV Station 1 has produced graphics for chess programs and another station has been using digitising with the Wild Vision genlock system (which synchronises computer and TV output) to produce graphics for sports coverage on swimming.

Going dutch

Big Ben, the Dutch BBC user group which lays claim to being the biggest outside Britain, is holding its annual show in Rotterdam on Saturday, October 15.

The emphasis this year is on the Archimedes with other presentations being made on education, genealogy and communications. Over 1500 people attended last year.

Contact Harry Linsen, Big Ben, Gommerskerspel 24, 2151 RA, Nieuw Vennep, Netherlands, or contact him via Dialcom 27:NPS583.

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BEEBUG – The Archimedes Specialists



Control Logo: successfully developed in the trial schools

Lego to Logo

Lego has got together with Logotron to produce the *Control Logo* pack, for use in project work by primary and middle school children.

The pack is designed for use with Logotron Logo, the Lego computer interface (part 1093) and the new Lego Technic Control 0 set (part 9700).

Development has taken place, said Dr Alex Wright of Lego's education division: 'It was on trial in 20 to 30 schools for 18 months, and many of the projects were developed by the teachers during that time.'

Six booklets come with the software. These cover: an introduction; case studies; a tutorial for beginners; a reference guide for the more confident; the mechanical principles and finally project ideas.

Dr Wright said the pack is expected to cost just under £90, or for schools starting from scratch about £300 in total.

Lego will provide training courses for teachers, details of which are available from its education division.

Master golf

Marlis Software doesn't claim to turn you into Sandy Lyle, but its *Golf Database* will store details of your favourite courses. It can cope with nine or 18 holes, for strokeplay and matchplay, and runs on BBC micros and Masters. Once you enter details of a course, it can display these against individual rounds and can relate your handicap to an opponents.

DOS Plus plus

Readers running a 512 co-processor through Watford's co-pro adaptor on a BBC model B may be limited in their choice of software because they lack certain keys.

Programmable Systems Design have a solution to provide INS, DEL, PG-UP, PG-DOWN HOME and END keys by altering your DOS Plus boot disc directly for £15.

A universe on screen

Starry-eyed readers can enjoy an exhibition at the Royal Greenwich Observatory's Herstmonceux Castle until August 30. As well as ancient star maps and 3D images from photographs, there are computers showing views of stars and galaxies. Entry costs £1.80 with 50p off for children.

THE COMMS COLUMN

■ Jeff Ashurst's round-up of bulletin boards in July caused a rush of calls. However, the bulk of the list was down loaded from a board, and some of the numbers are for membership-only boards.

These specialise in certain topics, and are not general messaging systems. While such boards do welcome new users with an interest in the relevant topic, they are not really the place for general chit-chat. Always remember your bulletin board courtesy, and respect the rules of the board.

You can usually find out about the nature of the board you're calling from the Information option displayed on the start-up menu.

■ Challenging the scrolling systems such as NBBS, OBBS and FBBS, and viewdata systems such as the educationally popular Communitel, a new bulletin board system software package has been launched called ACMB.

This works in both viewdata and scrolling modes on a standard BBC or Master, and offers a number of features not previously seen, such as viewdata mailboxing, online switching between viewdata and scrolling, and most interesting of all, a netmail facility.

All ACMB boards can be set up to pass mail to others, thus allowing inter-board messaging within the system. Any mail not for the original board is automatically uploaded to the host board, Musicworld, which then calls out to boards on the network, and downloads their mail, in a similar manner to the Fido system found on IBM PCs.

The software allows you to set up the frequency of uploading. The ACMB software costs £30. Details from the author, who is the sysop of Audio Output, a V23 viewdata board, on (0932) 244906.

■ After only a few months of operation, the value-added (25p a minute) computer chatline 'Desire' has closed down. The operating company, Communications and Media, has been bought out, and the new owners do not see this service fitting into their plans. This leaves Telemap providing the only data services on 0898 numbers, although there is some talk of other role-playing games being provided in this way. 0898 access is expensive – it's best used as a 'taster' for a service that you can subscribe to if you like it.

■ Telecom Gold will provide the international communications links for the organisers of Sport Aid '88. Using the international Dialcom service – of which Telecom Gold is the UK member – the national administrators can send messages quickly, but much more cheaply than by telephone calls, whilst planning this year's Race Against Time.

■ Our spotlight this month falls on Alternative Viewdata (AV) formerly called Piratel, which specialises in the pirate (and licensed) radio scene and other 'alternative' topics. A small computer-related section exists but this is not the prime purpose of the board.

It runs on a BBC micro using the ACMB software mentioned above, and your host is radio professional Danny Thomas. The system runs 24 hrs on 01-761 3444, V23 (1200/75) viewdata only, and like most ACMB boards, uses a ring-back system. This means that you let the phone ring two or three times, then hang up, then ring again within two minutes.

Dave Atherton

■ If you have any comms news items, please send them to David Atherton here at *Acorn User*, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ.

Fair Isle shows the DTP way



Fair Isle from the air: Sixty people and four BBCs some 120 miles beyond John O'Groats. The airstrip is visible in the distance. Photo by Dave Wheeler.

All 60 crofters on tiny Fair Isle in the Shetlands get the news courtesy of a BBC Master. It comes from a weekly paper which was started by local school children.

The *Fair Isle Times* is put together by Dave Wheeler on his Master using *Interword* to create a multi-column page. The paper goes not only to the islanders themselves, but is also sent to a further 90 subscribers worldwide.

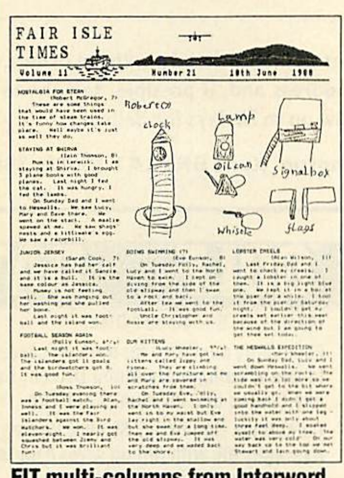
Dave explained: 'The island is popular with ornithologists and people who just want to get away from it all, and many of them come back year after year. They take the paper, and the locals send it to relatives - it saves them writing letters!'

The paper started off in the local school, and the front page is still given over to the children. Other pages cover the weather, local events and birdwatching. Sometimes magazine articles about the island are reproduced too.

What's on

The *Fair Isle Times* normally runs to four or six photocopied pages and is produced during term time, although it has hit the dizzy heights of 40 pages as a Christmas special. This summer Dave plans to do an extra single-sheet 'what's on' section for the first time.

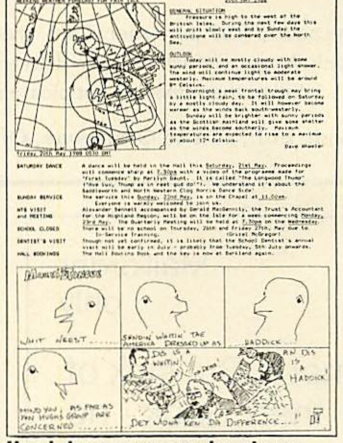
Dave also does the weather forecast and compiles data on the Master using his own Basic programs. He used to work in the Falkland Islands as a meteorologist and he still provides weather readings every hour for the Met Office.



FAIR ISLE TIMES

Volume 11 Number 21 18th June 1988

FIT multi-columns from Interword



Hand-drawn maps and cartoons

There are three other BBC micros, one being a Master in the school for the teacher and 14 pupils. As Dave pointed out, with just six hours of daylight in the winter there's plenty of time for programming. Just as well, as half of his income comes from freelance jobs, most of which rely on the Master 128.

A further bonus is the Prestel link that keeps him in touch with the mainland and means he can order his discs and hardware from the likes of Micromedia, Beebug and Watford. And, like all the best BBC owners, he's been an *Acorn User* subscriber since 1982.

Acorn gets new boss

Elserino Piol, the man who set up the deal when Olivetti bought into Acorn, has taken over from Bruno Soggiu as Acorn's chairman.

Piol was Olivetti's vice-president for strategy and development and right-hand man to Carlo de Benedetti, head of Olivetti. He is seen as a major influence in the Italian company and will bring the clout to persuade other divisions to take Acorn products such as the laser card (see *Acorn User*, August).

The move further confirms Olivetti's commitment to Acorn following the promises made to the government on the education front (see *AU*, May).

Peartree sold

Peartree Computers, the Huntingdon-based Acorn supplier and maker of accessory cards and cartridges, has been bought by Stockport-based DRAM Electronics in a deal with the official receiver.

DRAM said there would be no redundancies and that a new company, Peartree DRAM Computers, would be formed. The company will continue to sell Acorn-oriented products, especially its ROM/RAM cartridges for which DRAM supplies parts. DRAM also hinted that Peartree's name will appear on a new range of PC-compatible micros aimed at the educational market.

Back to Base

Computer Concepts has relaunched *Interbase*, the final part of its ROM-Link family, with a new manual and support disc.

Interbase met with a mixed reception when launched last year. Concepts boss Charles Moir said: 'I never felt there was anything wrong with *Interbase* but it was let down by the documentation, so that's been improved. Any bugs have been fixed and the card index improved. Existing owners will be entitled to a free upgrade.'

Contacts

BBC IV TV Centre, BBC Elstree Centre, Borehamwood, Herts WD6 1JF
Big Ben, Gommerskerspel 24, 2151 RA, Nieuw Vennep, Netherlands
BMCC, c/o 13 St John St, Bridlington, East Yorkshire YO16 5NL
Cambridgeshire Software House, Town Hall, St Ives, Huntingdon, PE17 4AL
Centre For World Development, Regent's College, Inner Circle, Regent's Park, London NW1 4NS
CLASS, 2 Howard Court, Howard Rd, Cambridge CB5 8RB
Cleveland Gallery, PO Box 41, Middlesbrough, TS3 0YZ
Computerlock, 7 Ganners Grove, Leeds LS13 7PW
Computer Spares, 61a Braemar Drive, Highcliffe, Dorset
Computer Aided Training, 1 Windergate, Frizington, Cumbria CA26 3QS
Dram Electronics, Unit 12, Kingston Mill, Chestergate, Stockport, SK3 OAL
LDA, 32 Bridge St, Cambridge CB2 1UJ
Lego UK, Wrexham, Clwyd LL13 7TQ
Marlis Software, 5 The Spinney, Woodlands, Ivybridge, South Devon
Norfolk TVEI Pilot, TVEI Centre, Lynn Grove, Gorleston, Great Yarmouth, Norfolk NR31 8AP
PSD, 20 Beechwood Rd, Easton-in-Gordano, Avon BS20 0NA
RSA, 8 John Adam St, London WC2N 6GZ
Royal Greenwich Observatory, Herstmonceux Castle, near Hailsham, East Sussex
Simnetts, Unit 15, St George Industrial Estate, Richmond Rd, Kingston-on-Thames, Surrey KT2 5BQ
Smith & Wiggins, 77 Edward Rd, Fleckney, Leicester LE8 0AD

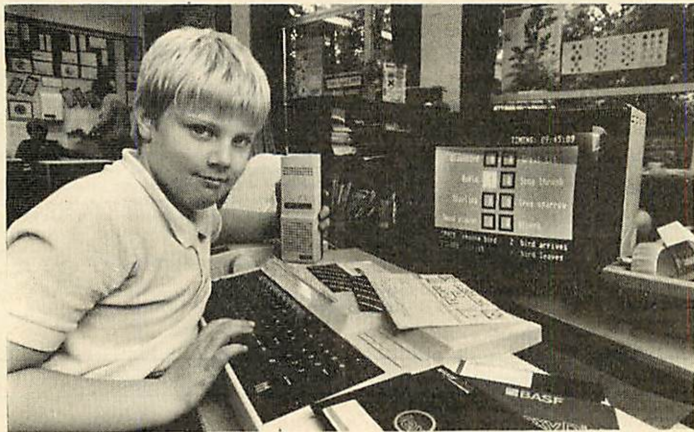
Erasure album to be won

Only two entries to June's Erasure competition were correct. Congrats to H Quayle and Dave Baron (Answers were: Robert Moog; Sequential Circuits; Depeche Mode, Yazoo and The Assembly.)

Now readers have another chance to win Erasure's hit album, *The Innocents*, as we are re-opening the competition with the eight copies still to give away. Here are three new questions:

- What does MIDI stand for?
- Name two companies producing MIDI kits for the BBC.
- Finish the Erasure lyric 'They used to talk about. . . '

Send your entry on a postcard to Erasure Competition, *Acorn User*, 20-26 Brunswick Place, London N1 6DJ to reach us by October 15.



May's *Bird Spy* competition prompted 61 entries. The under-12 answers were: the gold crest is the smallest British bird; a barn owl does not hoot; puffins nest in burrows or grassy cliff tops. Congratulations to winners Andrew Everitt, aged 7, Laura Hambly, aged 9, and Rory Renshaw, aged 7.

Our over-12 answers were: A pigeon is termed as a duck; red kites spend all year in Wales; kestrels hover when hunting. Well done to winners Stephen King, aged 12, Nicholas Fox, aged 14 and Kevin Morgan, aged 13.

BLUNDERBOX

The August issue featured an advertisement for Avon Computer Exchange (ACE), quoting an incorrect telephone number for their branch in Bedminster, Bristol. The correct number is (0272) 637981.

A duplication error on the *Acorn User* August monthly disc meant one in ten of the discs had some listings missing. If you have some of the files missing (take care, it's a flippy disc) then return it to Redwood Publishing, Marlbrough Road, Aldbourne, Wilts SN8 2DD for an immediate replacement.

The changes at Micronet and Telemap led to some mistakes last month. First, Shades cost 2p not 3p for Micronet users: second, Hotel California has been discontinued and is not part of Funtel.

The data capture pack from MESU announced in July's issue is not yet available. Trials in schools will run in the autumn, and the pack's release depends on their success. Contact MESU: (0203) 416994.

David King of Dudley College is on (0384) 455433, not the number given in the June issue.

POST A PROBLEM

Acorn User has a guaranteed fast reply service for enquiries. Your answer will be returned within 10 working days for just £3 (includes VAT), or your money back.

Just write out your problem, fill in the coupon (right), and send both off to *Acorn User* with a stamped addressed envelope and cheque or postal order for £3 made out to Redwood Publishing. If you want recorded delivery add the cost of this on. Include as much detail as possible, and a disc or cassette if a program is involved, with enough space to record any corrected listing.

Please note: debugging readers' programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the service will only be able to make general comments or suggest a strategy for the reader.

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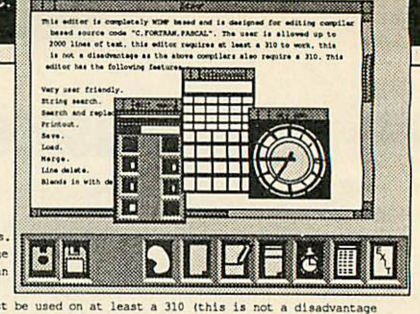
OFFICE USE ONLY Date in:

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FOR THE BBC SERIES AND ARC.



ARC DESKTOP + TRANSFER SOFTWARE.

This software is an enhanced desktop for the Archimedes ((C) Acorn computer Ltd) , and has the following functions:-

SCIENTIFIC CALCULATOR, A 30 function scientific calculator with a facility for number conversions.

CLOCK, A clock with a difference ! . Big ben digitised and incorporated in the archimedes desktop.

DIARY, Same design and function as Acorns standard diary.

NOTEPAD, An improved version of Acorns notepad, with direct pointer driven input.

PALETTE, A Palette of the same design as the Acorn Palette.

BBC CONVERTOR, This program blends into the desktop, when a RS232 lead has been connected between the BBC and the Archimedes select the 5.25' disk icon and a window showing the files on the BBC B disk drive appears on the archimedes. To load files just select them with a mouse (as many as you want) , and from the desktop menu select load to make the files transfer automatically from the BBC to the archimedes. The baud rate is set at 19200 baud although any speed can be used, the Convertor is intelligent and recognises automatically the file types contained on the BBC's disk drive.

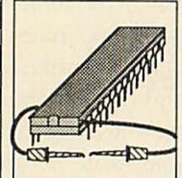
EDITOR, This is an optional facility for editing source text files for compilers (FORTRAN, C, PASCAL etc), to work it must be used on at least a 310 (this is not a disadvantage as none of the compilers are able to work on a 305). This advanced program blends fully into the desktop environment, and is very user friendly and intuitive in its use, the maximum text size is 2000 lines. The files produced are compatible with twin, it is entirely WIMP driven and needs no control/function keys.

The basic editor functions included are string search, search and replace, load, save, merge, print, clear.

"This kit from Brainsoft can be thoroughly recommeded" from review in Archive magazine December 1987.

SIDEWAYS RAM

BRAINSOFTS 32K STILL THE BEST VALUE SIDEWAYS RAM FOR THE BBC RANGE.



- *Uses latest technology.
- *32K of ram in a size no larger than a EPROM.
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- *Low power consumption.

Incompatible with rom boards except Peartree MR3000.

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This module has been tested with the following boards:- ATPL, Watford, and Peartree MR3000.

This module has the same construction of the 32K module but is minus the bank select line.

Write protect switch

At little extra cost a write protect switch can be added to a module which allows "protected" software to be loaded.

NOTE: it is illegal to copy or pirate software.

All the above are guaranteed for 1 yr. Please state computer.

SOFTWARE

SIDEWAYS RAM UTILITIES BBC B,B+,MASTER

Now Version 3 with ARFS and APB !!

-MENU DRIVEN SOFTWARE this selects RAMLOAD, RAMSAVE, RAMLIST, PRINTER BUFFER, or PROGRAMMERS UTILITIES.

-ADVANCED PRINTER BUFFER provides the user with up to an extra 63K of buffer space, which allows the user to continue using WORDWISE-PLUS, VIEW or BASIC whilst the printer is printing.

-PROGRAMMERS UTILITIES are a collection of 25 utilities including a full-screen-memory editor, all variables clear, program relocation, program compaction, program repairer, rom list, rom enable, rom disable, rom status, speed control, computer status, string search, variable list, vector list, close all files, list of the currently active variables, keyload, keysave, program comparison with a file held on disk, rom save, and screen compaction/uncompaction which can pack a mode 0 screen in less than 1K of disk space.

-ADVANCED ROM FILING SYSTEM provides the user with fast access to programs and data, so fast that it can load a 20K program quicker than the BBC's CLS command takes to clear the memory. The ARFS is capable of storing files longer than 32K in length, the amount of file space is limited to the number of sideways ram the user has, the number of files, length of names being limited by only the ram size. The ARFS when enabled by *RFS acts like a disk interface allowing saves and deletions, as well as loading, many programs which use 'legal' disk calls are compatible.

Also provided on the disk are three BASIC programs which can be easily adapted to run on NETWORK systems, ramload, ramsave and ramlist.

Provided with the sideways ram utilities is a 12 page instruction book, the software is supplied on a 40T disk with 80T conversion software.

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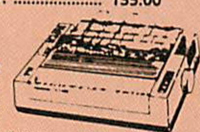
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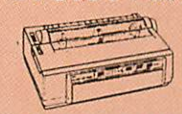
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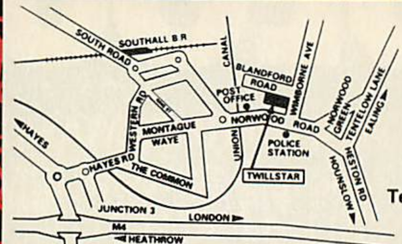
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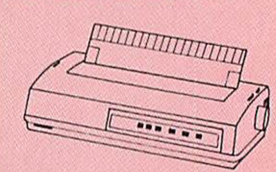
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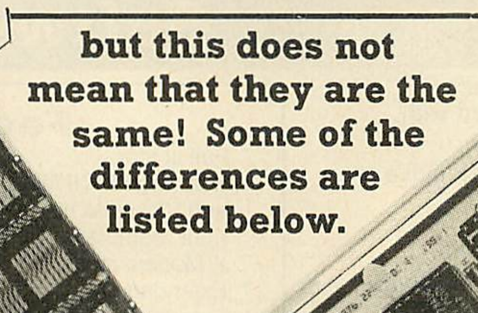
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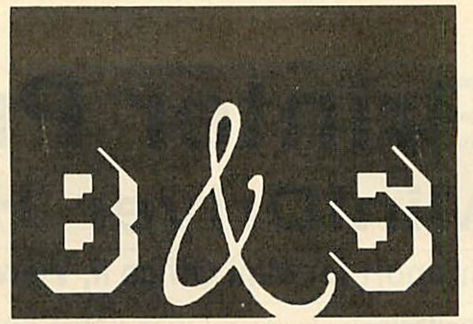
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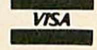
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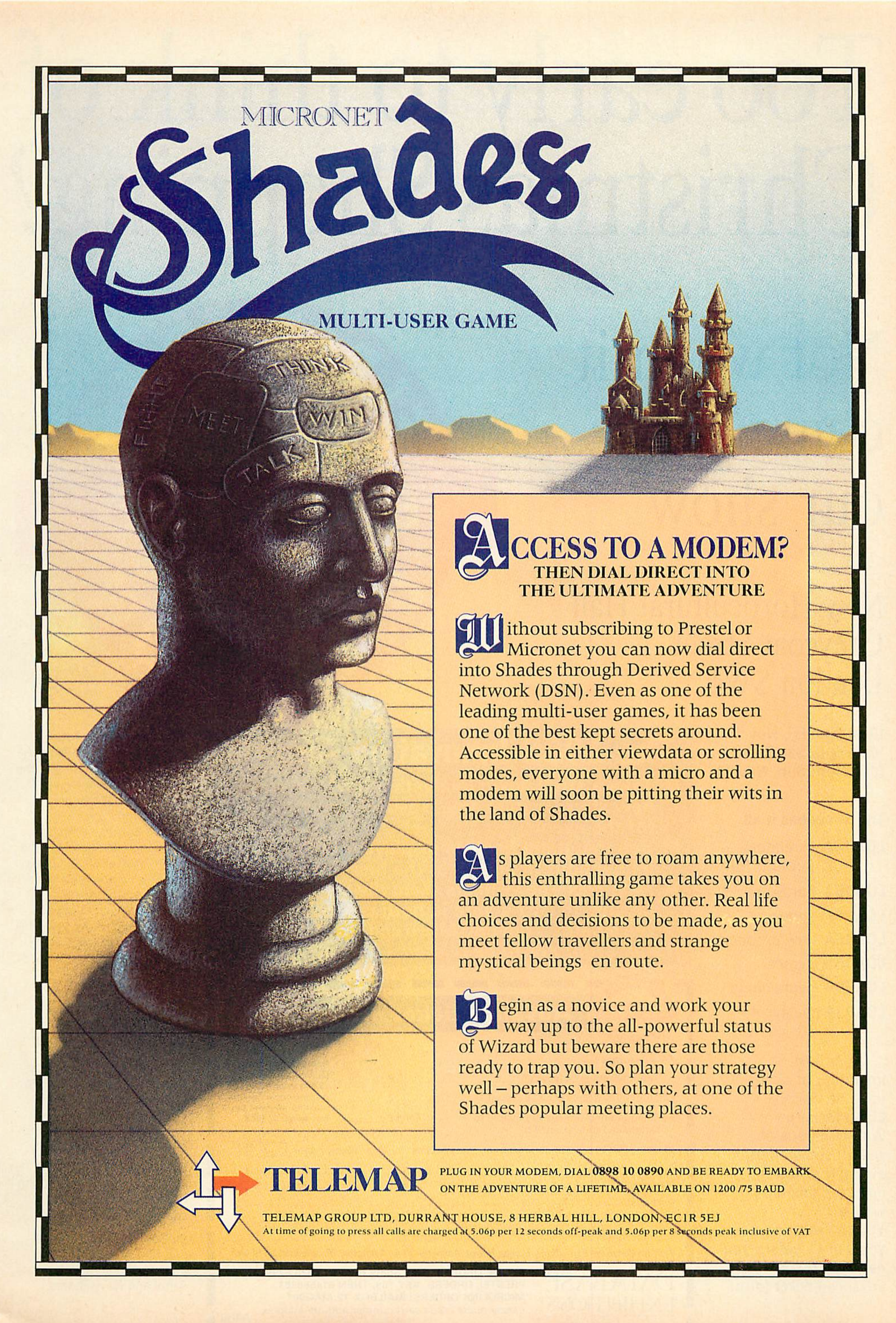
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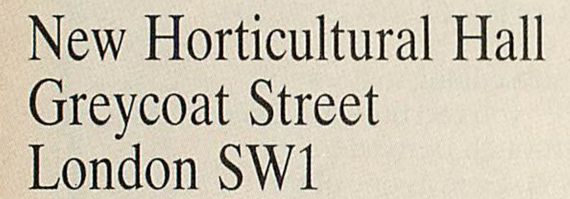
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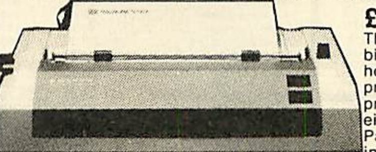
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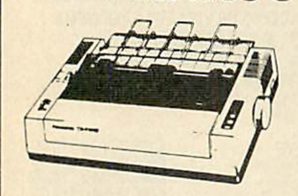
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WYSIWYG PLUS is a printer and screen utility for Wordwise Plus, View, Interword, and Basic users, supplied on a 16K Eprom. To obtain a particular printer effect, such as enlarged text, it used to be necessary to discover the appropriate 'printer control code' from your manual and incorporate it into your text. Secondly, you had to print several trial copies in order to position the effect correctly in relation to the rest of your text.

WYSIWYG PLUS simplifies this trial and error approach using easily remembered *commands. For example, *ENLARGED not only selects enlarged text on your printer, but uniquely shows you double width characters on your screen, even from within Wordwise Plus!

WYSIWYG PLUS incorporates a logo editor. Just draw your design on screen using the arrow keys, and save the results. Use the *GRAPHICS command to incorporate your design anywhere in your text; position and see your design in your text before faithfully reproducing a hard copy.

There is also special help for daisy wheel users. The *WHEEL command will prompt you to change daisy wheels whenever a change in type style is about to occur.

WYSIWYG PLUS is designed to work with the following systems:

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The package comprises of a rom, utils disc and a comprehensive manual. It is compatible with Master, Models B & B+. It supports DFS, ADFS, NFS and ANFS filing systems. **£49(d)**

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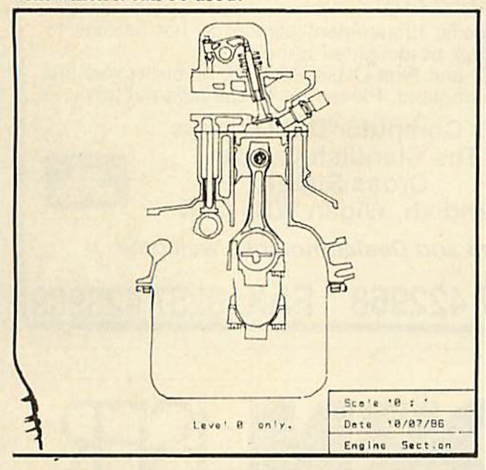
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HINTS & TIPS

DELETING DIRECTORIES

All you need to know about ADFS – including a neat deletion routine – a volume control ROM, 'hidden' catalogues and more besides

David Atherton

£10

CLEAN SWEEP

J N Abley of Bedford, like many of us, expressed frustration with the fact that you can't delete directories under ADFS unless they are empty.

If you know exactly what you want to delete, such as all the files on a disc, or a whole group of outdated files, then it is a nuisance to have to delete the contents of each subdirectory separately.

Mr Abley's program solves this by taking a named directory, and deleting the contents of this and any subdirectories it finds. You can set the program to ask for confirmation of each deletion if you wish.

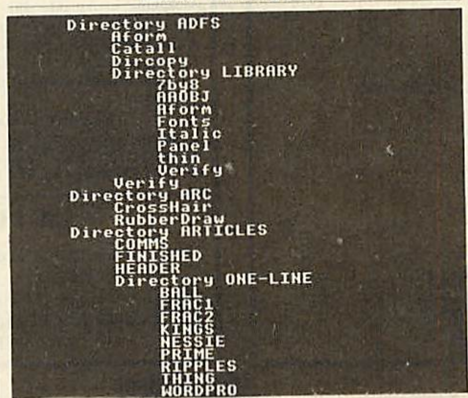
If you are deleting an extremely complicated tree, you might like to run the program in 80-column mode, although for most discs, 40 columns should suffice. An important point about the program is that, despite its recursive structure, it is totally legal, and will run on any type of BBC micro, and with a 6502 second processor.

The program should also work on an Archimedes under the 6502 emulator, which emulates the operating system call addresses, and with a bit of adjustment, in native mode. The program will also work with Winchester discs, and with the tree structure of Econet (Levels II and III). For the latter you will need to alter the attributes set (WR/WR instead of WR), and of course, the program will crash if someone is accessing one of the files while you're trying to delete it.

The program is written in Basic. Most of the time taken is in disc access, rather than machine operations, so there would not be much of a speed improvement by using assembly language.

A significant advantage of producing the program in Basic is that, it is possible for you to alter it more easily, for example to lock all files in a certain hierarchical tree instead of deleting them.

ADFS EXPLAINED



The tree structure of ADFS

Many people have written to *Acorn User* expressing difficulty with the Advanced Disc Filing System (ADFS). Most people understand the hierarchical nature of ADFS, where a directory can contain files and other directories. This allows files to be grouped sensibly, and removes the limit on the number of files per disc. But the other features, such as the different ADFS star commands, disc capacity and so on, remain a mystery to many. Perhaps this is because the directory structure is fairly well explained in the ADFS and Master User Guides, but the other aspects of the system are documented in less introductory language. The comments here also apply largely to the Solidisk ADFS, though some details are different.

Disc capacity under ADFS is exactly 1.6 times that under DFS. ADFS uses a double-density format; DFS uses single density. Even the 1770 DFS, which could use double density, doesn't. If it did, it wouldn't be compatible with the other (8271) DFS. Single and double density are just different ways of storing data on disc.

Most disc drives and floppy discs on the market for at least the last five years have been capable of either single or double-density work. The weak link was the disc controller chip that Acorn specified for the BBC. There are good historical reasons why that chip was chosen, but it has forced the prime BBC standard, ordinary DFS, to a lower capacity disc than found on other machines.

Incidentally, single and double-density have nothing to do with 40- and 80-tracks, although people often mistakenly refer to a 40-track drive as 'single-density' and an 80-track drive as 'double-density'. Density actually determines how much data fits on each track. Blank floppy discs are branded as 48 TPI (for 40-track drives) and 96 TPI (for 80-track drives), single or double-sided. But these days they are all branded double-density. There is also a quad-density or high-capacity system used in the 1.2Mb drives of IBM PC-ATs and the SJ Research Econet fileserver, but you can't use that on standard BBCs and Masters.

As ADFS uses a different disc format anyway, Acorn was able to make the system work in double-density from the start, which was a good move, even if it forced model B users to upgrade to a 1770 double-density interface to use the system. For various technical reasons, 16 256-byte sectors per track were chosen, which means that a single-sided 40-track disc (this is known as S format) will produce 160k, a single-sided 80-track disc (M format) 320k and a double-sided 80-track disc (S format) 640k. You don't actually get quite as much file space as this, because like DFS some is used for catalogues.

When any DFS command is issued, the first thing to happen is that the disc catalogue is loaded into memory. You'll notice this as DFS spins the drive when a *CAT command is used. ADFS however, keeps the catalogue in memory, to reduce disc access and time taken. To control this, two commands, *MOUNT and *DISMOUNT, are provided. *MOUNT loads the directories' catalogue into memory, and *DISMOUNT 'forgets' the catalogue in memory. Actually you rarely have to use

either of these commands, because if a command like LOAD or CAT can't find a catalogue, it performs an automatic *MOUNT. When you mount a new disc, you automatically dismount the old one.

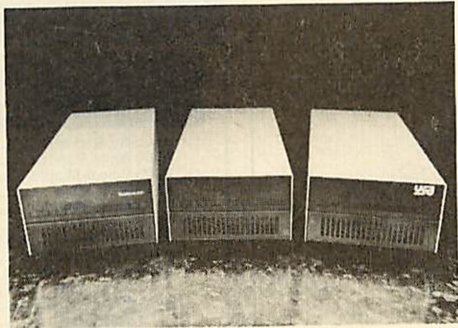
However, if you change a disc without dismounting and remounting and you use a new general command you'll get an error – either 'No directory', 'Disc changed' or 'Bad FS map' depending on the circumstances. You should type *DISMOUNT followed immediately by *MOUNT.

Another problem with failure to remount a newly changed disc is that *CAT will display the old catalogue, not the new one (but followed by the drive number always remounts the disc, and avoids this problem). I find that the first thing you want to do with most discs is catalogue them, so typing *CAT:0 (or:1) is a good way to both mount and read the contents.

*BYE is a special command you only need to use if you have a Winchester, or hard disc drive. Hard discs have a place where read/write heads can be 'parked' away from the data area on the disc. This avoids damage if the drive is moved while switched off. *BYE parks the heads immediately before you switch off – floppy drive owners can ignore it. By the way, you don't need to dismount before switching off as this only affects a memory flag – it doesn't do anything to the drive.

Like DFS, ADFS always stores files in adjoining sectors. That means that if the first 256 bytes of a file are on track 6 sector 2, the next lot are in track 6 sector 3. This makes for very fast loading and saving, but does mean that if a file is deleted, the space on disc that it used to occupy can only be used when a brand new file smaller than or the same size as the deleted file is saved. If you imagine the sectors on a 640k ADFS from 0 to 2559 as a straight row (rather than concentric rings), then the line is full of gaps, first some files, then some free space, then some more files and so on. The *MAP command shows you where the spaces are, by reporting the starting sector of each gap, and its length in sectors. Both numbers are given in hexadecimal.

The more gaps there are, the more memory ADFS must devote to remembering where they are, and there comes a point where it can't remember any more. Two warning messages are used, 'Compaction recommended' when the limit is close, and 'Compaction required' when it is reached. Compaction means moving the files around on the disc so that there are


Winchester drives use ADFS

larger, but fewer gaps.

Unlike *COMPACT on DFS, which rearranges files so that there is only one large gap at the end of the disc, the same command in ADFS only removes one gap. That is, it takes the files between the first and second gaps, and moves them so that there is one gap less. To compact the files totally, repeated *COMPACT commands are required. *COMPACT takes two parameters which are the first memory page to use as a memory buffer, and the number of pages to use. Both of these must be in hex, so *COMPACT 0E 72 will use all the free memory on a normal Master 128, and *COMPACT 1D 63 is the maximum on a model B. To use only screen memory, so as not to corrupt the current program or data, use *COMPACT 30 50. On a Compact, if you omit the parameters, a default of 0E 72 is used.

The reason there are two compaction messages is to warn you; if you ignore the first, you'll find that when 'Compaction required' appears, you won't be able to save a file – and compaction corrupts memory. So if you have a valuable program in memory at this point, you'll have to mount another disc (already formatted I hope, because formatting corrupts memory too), save the file, and then perform the compaction on the original disc.

One point to note about ADFS is that it doesn't suffer from the 'Can't extend' problem that has had many DFS users tearing their hair out for years. Say for example a file called Sales was stored in sectors 1 to 5, and this was followed by a file called Accs starting at Sector 6. Then Sales is amended and new data is added to increase the file size to six sectors. The new Sales will not now fit in Sectors 1 to 5, and Sectors 6 onward are already occupied, but DFS insists that a new file under the same name is stored in the same place. So after the first five sectors are written, an error message 'Can't extend' is given, and the file is useless, being incomplete.

With ADFS, a large enough gap is searched for, and if found, the file is moved to there. If there is no suitable gap found, the error message 'Disc full' is issued. Even so, it is perfectly possible to have a disc with 100k or 200k free, but no gap bigger than 10k, which is confusing when you're trying and failing to save a small file, and *FREE reports plenty of space. *FREE takes no account of where exactly free space is; it merely reports the total amount free on disc. However, keeping a disc reasonably compact will solve this problem.

£15

VOLUME CONTROL

Following his Slow Motion ROM earlier this year in Acorn Forum, Martin Hesketh from Ryton, Tyne and Wear, has come up with another idea along the same lines for Master users, a volume control ROM.

Martin realised that once a sound envelope has been defined, there is no simple way of changing the volume without totally redefining the envelope. This program allows independent control of the volume of envelopes 1-4, and also allows separate control of the start and finish volume of each envelope.

The program is a ROM image and uses the chips polling call to test the volume control keys. All the keys are on the Master's numeric keypad, and are shown below:

1 Select Envelope 1
2 Select Envelope 2
3 Select Envelope 3
4 Select Envelope 4
+ Increase start volume
– Decrease start volume
/ Increase finish volume
* Decrease finish volume

The program will work with some commercial games, allowing some sound effects to be switched off.

The method used is to modify bytes in the Master's envelope definitions stored in page &8 in memory. These definitions have not changed between the Master and earlier machines, but the program still won't work on the model B because it doesn't have the ROM polling call.

The program can be typed in from the yellow pages. When run, it saves a file called VOLROM and also loads the program into bank 7 of the Master sideways

RAM. The last parameter after the *SRWRITE statement can be altered if you want to use a different bank. The VOLROM file can be loaded in like any other image using *SRLOAD VOLROM 8000 7, followed by CTRL-Break.

The monthly disc also contains a sample tune 'Alla Danza' from the *Water Music* by G F Handel, which uses different envelopes on each channel, and so shows the effects of the ROM very well.

£5

GETTING THE MESSAGE

A topic of popular interest among readers is 'fiddling' with the DFS catalogue, to hide files, alter filenames, and generally do things not possible with standard DFS commands. The next contribution, which also comes from Martin Hesketh, is just such a program.

The program will alter the disc catalogue so that when *CAT is typed a message will be displayed instead of the list of files. The files themselves will not be shown. Needless to say, when booting, CHAINing or otherwise running the files, there is no difference. This sort of thing is useful if you want to produce software but don't want people seeing the files on the disc.

The size of the message you may display depends on the number of files you already have on the disc. The absolute maximum is 165 characters, reduced by 5 characters for each file required. The program works all this out for you, and tells you the maximum message size.

A very important point is that the message must be saved onto a blank, freshly formatted disc. If there are any files already on the disc, the program will destroy their catalogue entries (although it doesn't touch any other area of the disc). A warning procedure is included which checks to see if the disc you are using for the message is really blank – if not, you have to specifically press Y to alter the disc.

The program asks for the mode in which you want the message displayed, and then the text of the message. Note that teletext colour codes and other control codes cannot be included. But you can include carriage returns, which are treated as part of the message.To end the message, press CTRL-@.

After the message has been put on the disc, it can still be used to save files, depending on the length of the message you chose. Although the files saved are not shown with *CAT, they can still be identified with *INFO, for example *INFO$.* will display any files saved in directory$.

£5

SUPERART TIP

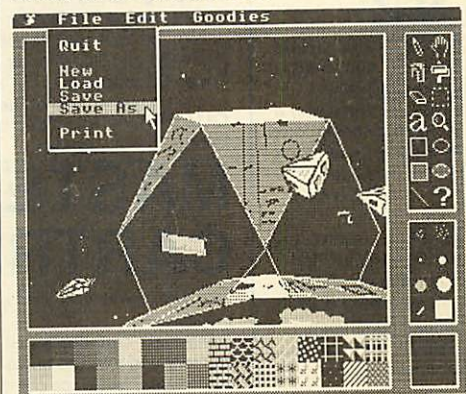
Alistair Brown from Feltham has discovered that the Master version of AMX *SuperArt* uses shadow memory for the drawing screen and uses the main screen memory to store the complete pictures. So a quick and satisfactory way of switching between the two is to directly alter the shadow screen setting.

This can be done with *FX113, so Alistair has programmed two function keys as follows:

```
*KEY 0 FX113,1|M|M
*KEY 1 FX113,2|M|M
```

To display a full picture, press * then f0, and to return to normal drawing, press *, then f1. The reason that you have to press * rather than include it in the key string is that *SuperArt* empties the input buffer every time the * option is used.

However, it is always useful to remember that the full screen is updated only when the picture is moved or the file closed, so if you do want to see any changes to the screen, one of these actions needs to be carried out.



Master Super Art

£5

COMMENT LINES

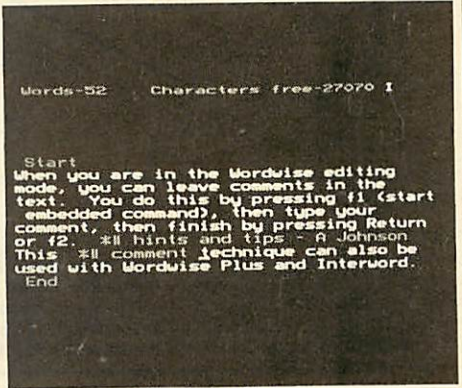
It is fairly hard to come up with an original tip for *Wordwise* these days, but now Alistair Johnston has written something that I've never seen before – placing REM-type comments into text files in *Interword* and *Wordwise Plus*. *View* also has a similar system built in. Comments can be inserted into text by using the edit command 'CO'. All subsequent text on that line is left out when the document is printed.

When you are in the *Wordwise Plus* editing mode just press f1 (start embedded command), then type your comment, and finish with Return. The comment must start with *|. So for example, if leaving yourself a note about a control code, the sequence would be:

‹f1›*| OC27,45,1 will start underlining ‹Return›

f1 is the 'start embedded' key, Return is the normal Return key. In *Interword*, pull down the embedded command menu, and move to the '*'. Press the '|' key and then type your comment.

The system works by using the BBC operating system's own REM feature. If a



Comments on Wordwise Plus

star command starts with a symbol, then the whole line is ignored by the OS, but no error is generated – in other words it's treated as a comment.

Comments in text files are chunks of text that you can see on screen when editing, but which do not appear on preview or print-out. They can be used as notes describing what the embedded commands in the text file are (as in the above example), or notes concerning linked documents, copy recipients etc, which you don't want to appear on the actual document, and finally, as the basis for file management programs. A program could make use of comments in the same way that David Andrew's *Viewsuite* from September 1985 did. The additional information is on the contents of the file stored within the file, rather than in the catalogue.

Contributions to this column are most welcome. Submissions are preferred on paper and disc and should be sent to David Atherton, Hints and Tips, Acorn User, *20-26 Brunswick Place, London N1 6DJ.*

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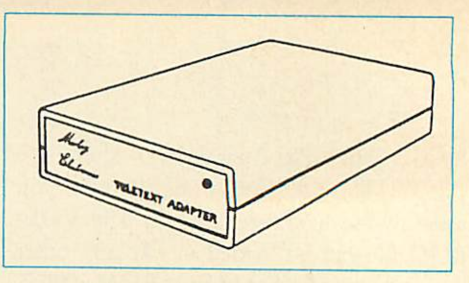
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WHAT THE REVIEWERS SAID:

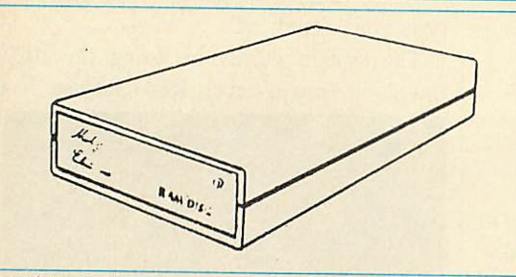
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RAMDISC



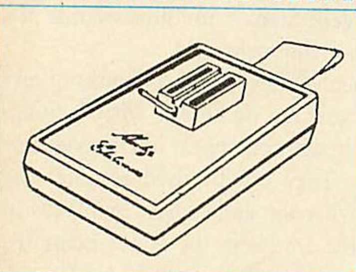
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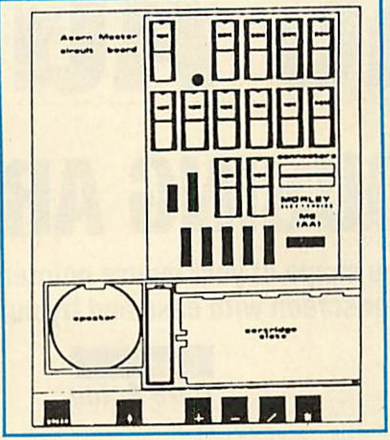
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MOUSING AROUND

Change the shape of your mouse pointer, pick up a section of your screen with ease and try out the Guinness

Dave Acton

I wonder how many readers have thought it would be nice to change the shape of the mouse pointer for a particular program, but have been dissuaded by the complexities of the task. Well, listing 1 on the yellow pages is an easier alternative – a mouse pointer editor.

There seems to be an unnecessarily large variety of ways of switching the mouse pointer on and off. MOUSE ON 1 is generally the way to get things going, but unless you've performed a *POINTER 1 beforehand, nothing may happen at all. Redefining the mouse shape is even more fiddly, requiring the use of the Osword call 21. A parameter is needed to contain details about the size of the pointer shape, the location of the 'hotspot' (the pixel to which the mouse is actually pointing) and a pointer to the data itself. Once you have defined your pointer shape, you can call it up on the screen using *FX 106,n where n is the shape number and must be in the range 1 to 4. Note that *POINTER can only be used to switch on the familiar 'system' pointer and not 'user-defined' pointer shapes.

Listing 1 takes care of all the details and precedes all saved definitions with a short piece of code (labelled '.extrabit' in the listing) which issues the appropriate Osword and Osbyte calls. The type of the pointer files is set to &FFC or 'utility' so that they may be loaded and displayed using just *filename or *RUN filename. So, having saved a pointer shape as 'MyPoint', it might be used elsewhere thus:

```
10 REM >MyProg
20 MODE 9
30 *MyPoint
```

The screen layout of the program in listing 1 consists of a 'blown up' view of the current pointer in the centre, colour information on the left and the four currently defined shapes on the right (actual size).

TABLE 1 – EDITOR KEYS

Move left	Z (or use mouse)
Move right	X (or use mouse)
Move up	' (or use mouse)
Move down	/ (or use mouse)
Plot point	Return (or left mouse button)
Delete point	Delete (or right mouse button)
Clear grid	C
Test definition	T
Save definition	S
Load definition	L
Select colour	f1-f4
Select pointer	f5-f8
Fix 'hotspot'	Home (or middle mouse button)
Alter red, green and blue colour levels	Hold down R, G, or B with left or right cursor keys
Quit program	Q

At the bottom of the screen layout is a status box which usually displays the words 'Edit mode'.

The small white square is the cursor and may be moved around either by using the mouse or with the keys listed in table 1. The red square indicates the location of the 'hotspot'. To plot or delete a point, press the Return or Delete keys respectively, or use the mouse if you prefer. A line may be drawn (or deleted) by holding down the button or key and moving the cursor in the appropriate direction. Up to four shapes may be edited and the current shape is indicated by the number in the red box on the left of the screen.

The box in the top left-hand corner indicates the currently selected colour and below it the three available mouse colours are shown. Colour 0 is fixed and forms the 'see-through' part of the pointer; the pointer is always a square, but most of the square is transparent. The other colours may be changed by holding down R, G or B while pressing the left or right cursor keys. This will alter the levels of red, green and blue for the current colour and the individual strengths are shown by the three bars on the left. In order to select a new colour or pointer, just use the function keys listed in table 1 above.

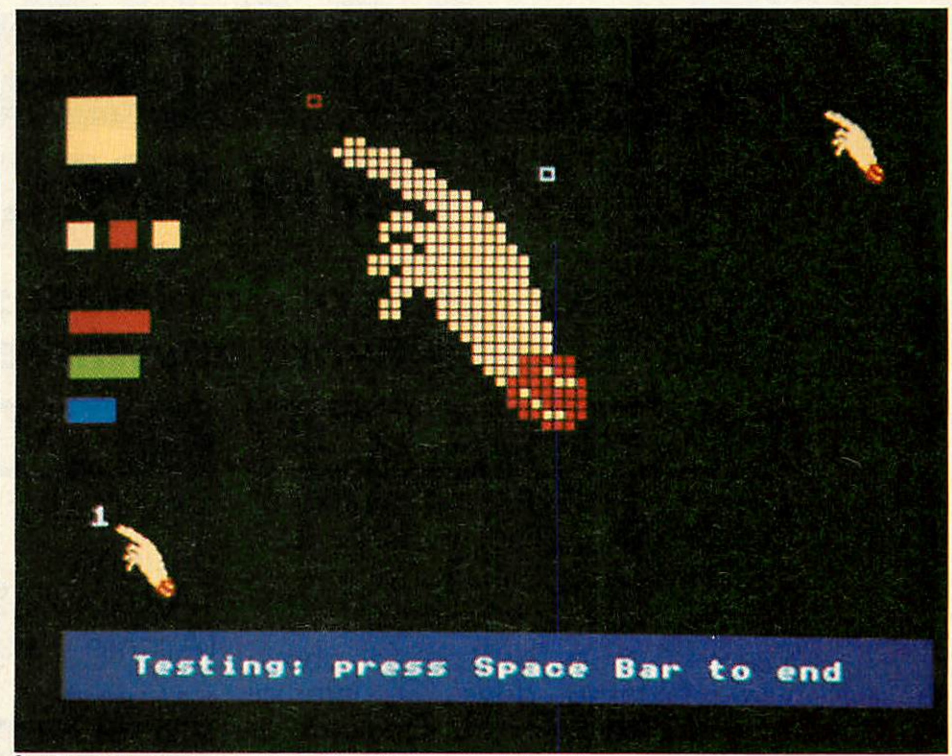
To load or save the current pointer, press L or S, enter the filename then press Return. Note that only the current definition will be saved or loaded – you'll have to save each of the pointers separately if you have designed more than one. To test a pointer shape, press T. The current shape will be converted into a real pointer for you to move around with the mouse. You can press the space bar when you want to return to Edit mode.

Most of the program should be fairly self-evident; much of it is concerned with drawing boxes and plotting points. You will notice some assembly language in PROCinit and it's worth describing what this is for. The first part is a 'zoom' routine which expands a specified shape to fill the main grid. This allows instantaneous switching between pointers. The zoom itself is quite simple, and consists of two nested loops. On entry, R0 contains the screen address of the small version of the shape and, incidentally, the start of the screen (base%) is found legally using

"OS_ReadVduVariables". Each pixel of the small shape is triplicated horizontally and vertically when plotting the larger one. By careful use of OR, the grey grid is preserved throughout.

The ARM machine code at 'extrabit' is saved with each definition. It begins by setting the mouse colours using "OS_WriteN". For simplicity, the red, green and blue levels of each mouse colour are stored at 'rgb%' with the appropriate VDU 19, x, 25 values stored in between. Thus a single call to "OS_WriteN" (which displays the string of length R1 stored at R0) can be used to sort out all of the colours. The appropriate "OS_Byte", 106 is issued having read the pointer number from the data block beyond and "OS_Word", 21 is called to redefine the pointer shape.

The shape data has to be prepared and placed at '.buffer' before testing or saving, and this is done by FNmake. This function examines the currently selected shape using the good old Basic POINT( ), and after stripping off unnecessary blank pixels, converts the image on the screen into two-bits-per-pixel data to be stored in the buffer. You will notice how the new Basic 5 arithmetic shift operations '»' and '«' have made life easier in FNmake and PROCload (which has to reverse the process employed by FNmake).



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CLEANER WINDOWS

Although the WIMP system is extremely comprehensive and, on the whole, one of the best written pieces of the Arthur OS, it can be tiresome and awkward to set up all the data blocks necessary when all that's required is a simple 'pop-up' and 'pop-down' box. Listing 2 is Simon Pettitt's solution, which uses a method employed by the 'rotating goblet' program from June's Agora.

A section of the screen may be picked up using the sprite command *SGET or the equivalent command VDU 23,27,1. Simon's routine uses the latter in the procedure PROCwindow to preserve the appropriate area of the screen. PROCwindow takes six parameters: the first four are screen co-ordinates delimiting the window, the next is the window's background colour and the last one is the window number. PROCwindow simply creates a sprite and calls it by the window number specified. To restore the screen, PROCclose takes the window number (and co-ordinates) and plots the overwritten section of the screen back to where it was.

One word of warning: ensure that SpriteSize is configured to a suitable value before running Simon's program – about 48k of sprite space is ample. If you have a 300 series machine, you can configure sprite workspace in chunks of 8k, so type:

```
*Configure SpriteSize 6
```

and press CTRL-Break before running Simon's demonstration.

Users of 400 series machines can only set aside memory in 32k blocks and so should allocate 64k with the command:

```
*Configure SpriteSize 2
```

Note that whereas *SGET will report an error if there is insufficient workspace in which to store the sprite, the equivalent VDU 23,27 command does not: it simply does nothing at all if it runs out of room!

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MY WORD! IT'S YOUR COMMAND

Now that Basic programs may be run by simply typing '*PROGNAME' or '*RUN PROGNAME', the way has been opened up for writing utilities and library functions in dear old Basic. However, I have always wanted a way of appending parameters to the command so that, for example, typing:

```
*CountWords MyText
```

would not only run the Basic program CountWords but would also pass on the filename MyText. Mark Twells of Loughborough has a solution.

Mark has written a function called FNcommand that returns, as a string, all that followed the *PROGNAME. It works by calling the rather obscure routine 'OS_GetEnv' which is detailed on page 338 of your Programmer's Reference Manual (if you have one, otherwise on page 338 of someone else's). 'OS_GetEnv' takes no entry parameters and returns the following information:

- R0 = address of the * command string
- R1 = highest RAM address available
- R2 = address of 5 bytes containing the time the program started.

Having located the rest of the command line, a return character is placed at the end of it. It is odd that the operating system deals mostly with strings terminated with a zero-byte whereas Basic requires ASCII 13 to indicate the end. Finally, leading spaces are removed and the string is returned using Basic's indirection operator '$'.

To try out Mark's program, save it as "Three" and type:

```
*Three pints of Guinness and a packet of crisps please
```

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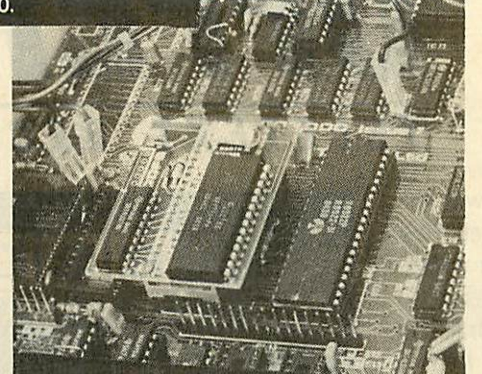
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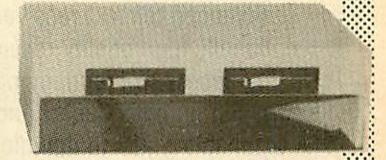
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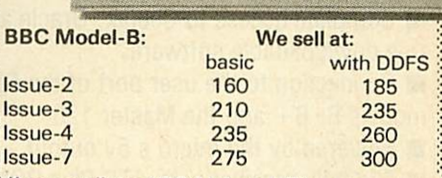
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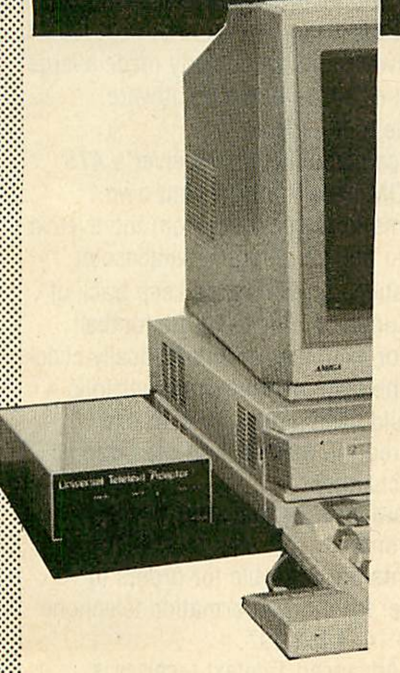


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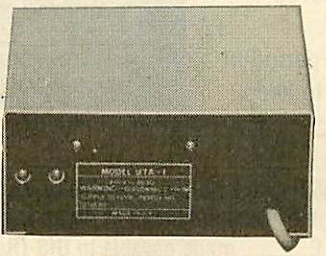
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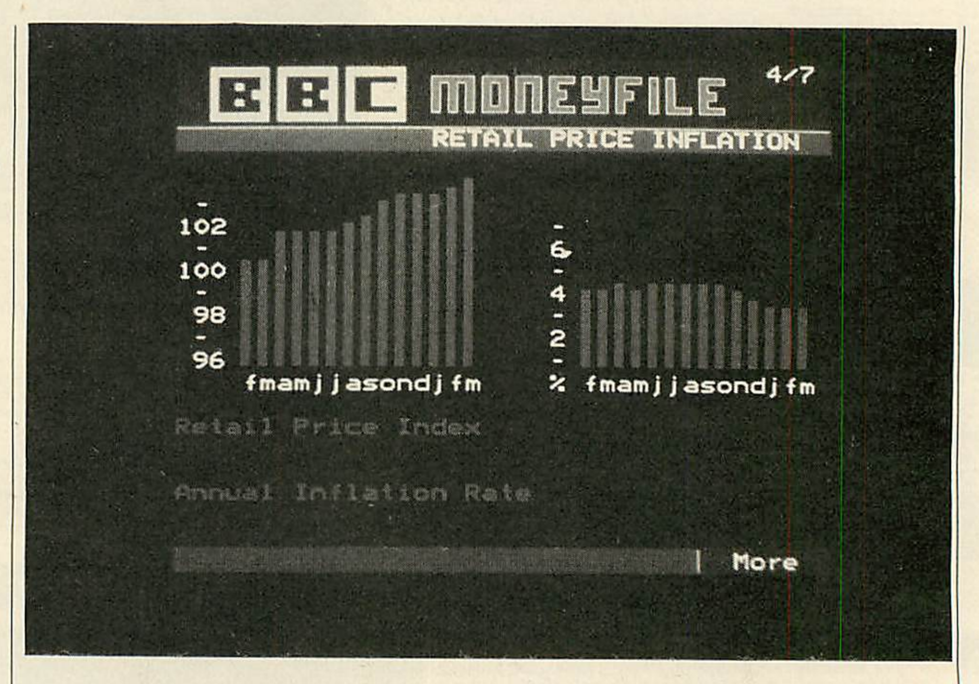
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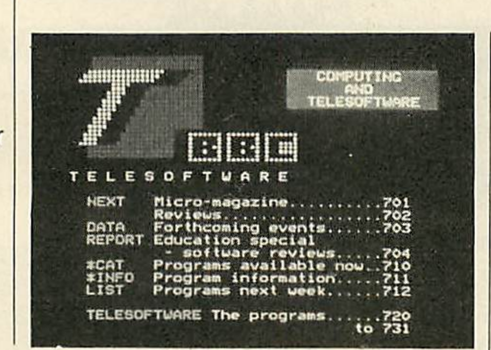
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A CLOSER LOOK

The BBC-approved GIS Teletext Receiver is bristling with features

The BBC has joined forces with General Information Systems, creators of the Red Box home security system, to launch the BBC Advanced Teletext Receiver.

The adapter gives you access to the information on Ceefax and Oracle and lets you download free telesoftware.

A single metre-long thick lead connects to the user port on the BBC micro or Master 128. Master Compact owners with an add-on user port can also receive the benefits of teletext.

The adapter takes its power from the micro's 5v output. In addition, you are supplied with an *ATS Plus* ROM to install in one of the sideways ROM sockets or a ROM cartridge or expansion board. This is a new version of the *Advanced Teletext System* ROM released by the BBC two years ago.

Tuning is achieved by typing in *TELETEXT and then pressing Shift-f0. The screen displays a station tuning page, and gives simple instructions for tuning. First you have to press 'S' to start scanning through the channel wavelengths, and when a signal is located the scan is halted. This allows you to either save the station by pressing K, or S to continue scanning. A strong signal is indicated by the status report showing 'On-tune' and a good steady screen display. In some areas channels are transmitted on several wavelengths, and so you should scan through the entire selection before choosing one.

Individual teletext pages are called by simply pressing their unique three-figure number. The software also allows you to make use of the linked-pages system. At the bottom of the screen there are usually a series of coloured boxes followed by either page numbers or coloured keywords. These correspond to the four coloured blocks on the keystrip (f1 to f4). This linked-pages system certainly makes selecting any desired page much easier.

The 'kept page' feature is a really useful asset. If you are using teletext for long periods of time the terminal has the ability to keep pages for you, updating them when it can. This means that when you re-select them they appear immediately, without having to wait for them to come round.



Probably the best feature of the *ATS Plus* ROM is the way the telesoftware is handled. The Ceefax service has several pages dedicated to computer software. These are updated weekly. By pressing f5 a complete list of all the telesoftware available for the week is displayed. From this catalogue programs and files can be downloaded and saved to disc with tremendous ease. There is none of the confusion that the original TFS caused when in the telesoft mode, with its black screen and Searching message.

Since its release, the *ATS* ROM has been well supported by the BBC. For instance, the BBC has broadcast a program which allows a whole week's telesoftware to be downloaded off-air automatically. Other packages include programs that can collect the major news stories and then print them out in newspaper format. These programs will all work with the *ATS Plus* ROM too. In addition BBC Schools Broadcasting has started to use the telesoftware service for sending out details of its broadcasts.

The most exciting development is the use of *ATS* ROM commands so that your own programs can extract data from teletext pages. One example of this is a program that allows your computer to look at the weather pages on Ceefax every day, take the data and plot graphs. This allows a database of weather information from all parts of the country to be built up. In the same way, checks can be made on how your favourite football team is doing. Financial information on Ceefax also allows an automatic check on the state of your share portfolio — and you could even build a system that monitored the market, then warned you of changes.

The ROM comes with a function key strip and an excellent user guide.

There is no doubt the new Advanced Teletext Receiver is an impressive performer. One reason for the BBC's adoption of the GIS adapter is that the BBC regards its Ceefax service, and especially the telesoftware service, as an important part of an integrated system.

Perhaps the most important aspect of the adapter is that it is BBC endorsed, and so everything that is broadcast will work. If you want access to Ceefax and Oracle this is a great way to receive it.

CURVING THE BEZIER WAY

What at first appear to be complicated mathematical formulae are actually a simple, and very useful, way to represent curved lines and surfaces

George Blanchard

Drawing smoothly curved lines and surfaces may seem to be beyond the capability of the BBC micro, but it is possible to produce them by using the formulae known to mathematicians as splines. A particular form of spline is known as the Bezier curve, named after the mathematician Pierre Bezier. A corresponding surface is known as the Bezier surface.

Some of the ideas behind the generation of the curves and surfaces may be apparently complex, but their use is fairly simple. Bezier surfaces were originally designed for use in the design of body shells for automobiles but they have found uses in many apparently unrelated fields. Bezier curves are topical because of their use in software like *Adobe Illustrator* on the Macintosh, and in the font designer on the Archimedes' Welcome disc.

A Bezier curve can be specified by locating just four points which have a clear geometric interpretation. The basic idea behind all splines is parametric curves. A familiar use of geometric parameters is in specifying a position on the surface of the earth. Two parameters, latitude and longitude, are used. Some conventions are necessary in order to use the parameters – the zero for longitude is the meridian which passes through Greenwich, and the reference for latitude is the Equator.

It would be possible to use the same convention on the moon, but the distance between two positions specified by latitude and longitude would not be the same as for equivalent positions on the earth. So if you want to calculate the actual distance between two points you also need some extra information (the average radius of the earth or moon would be a good start). In a similar way, the three x, y and z co-ordinates of a point on a line in space may be represented in terms of a single parameter and a number of coefficients. The coefficients correspond to the additional information that is needed to work out particular values, just as we needed the radius of the earth to calculate distances between points. Conventionally the parameter t is taken to vary between 0 at one end of the curve and 1 at the other. The x co-ordinate of a point can be represented by a formula like the one below:

$$x(t)=a(0)*((1-t)^3) + a(1)*t*((1-t)^2) + a(2)*(t^2)*(1-t)+a(3)*(t^3)$$

In this formula, there are four coefficients, a(0) to a(3). It is easy to see that similar formulae can be written for y(t) and z(t) but with different coefficients; for y, call the coefficients b(0) to b(3) and for z, call them c(0) to c(3). The real trick with Bezier curves is choosing a method of finding all the coefficients in a way that can be interpreted easily and geometrically.

If you look at the formula for x and put t=0 (remember that t is zero at one end of the curve) you can see that all the terms involving t alone become zero and so x(0)=a(0). If you put x=1 all the terms involving (1−t) become zero and so x(t=1)=a(3). So knowing the start and end of the curve tells you two of the four x coefficents. In a similar way y(0)=b(0), y(1)=b(3), z(0)=c(0), and z(1)=c(3). If we know the starting and finishing points of the curve, then we can specify the first and last coefficients in each equation.

We still have two coefficients to find in each equation: these control the actual shape of the curve between the two end points. Bezier curves use two more 'control' points to specify the values of the two remaining coefficients. The points are used to define the tangents to the curves at the ends as well as the 'fullness' of the curves.

Without going through the mathematics, the values of all the coefficients for the x curve are:

$$a(0) = x(0)$$
$$a(1) = 2*x(0) + x(1)$$
$$a(2) = 2*x(3) + x(2)$$
$$a(3) = x(3)$$

Of course there are similar equations for b(1) and b(2), c(1) and c(2), so a(1), b(1), c(1) and a(2), b(2), c(2) are the positions of the second and third control points.

Figure 1 shows four Bezier curves. The centre curve uses four points, a0 – a3; the other curves use the same end points but different central points 1 and 2. The 'fullness' of the curve is changed according to the distance between the end point and the central control point – the curve is 'pulled' in the direction of the control point.

It is important to note that the shape of the curve is completely specified to any degree of accuracy we want by the location of the control points. You can see these locations as three arrays a( ), b( ) and c( ). You can therefore design a curve and then keep it, by filing away the values of the coefficients or the control point locations.

When using a Bezier curve, a value for the parameter t is inserted in the formulae for x, y and z and the co-ordinates of a specific point on the line are generated. The limit on the accuracy of the curve is not the same as the resolution of the display system on the computer – it is governed only by the accuracy with which the computer can

perform its calculations. This is why spline curves are used in applications like fonts, drawing and computer-aided design, because the final output may be on a laser printer or plotter with far greater resolution than the computer's monitor.

The simple program shown in Listing 1 on the yellow pages will draw a two-dimensional curve on the screen of your BBC micro. This simplifies the Bezier curve by ignoring the third, z, dimension, but the principle can easily be extended. The two end points of the curve are fixed at the edges of the screen and half way up. The curves shown in Figure 1 were produced using the values in the table below.

More complicated continuous curves and shapes can be constructed by joining successive Bezier curves together. Some ingenuity may be required in doing this but there are some rules to follow:

■ The first control point of a curve is the same as the last point of the previous one. This ensures that the curves actually meet.

■ The third and fourth points of the first curve and the second point of the second curve should be in a straight line, so that the curves meet smoothly.

A simple place to join two curves would be a point where the tangents are either horizontal or vertical. This makes it particularly easy to ensure that the three points are in a straight line.

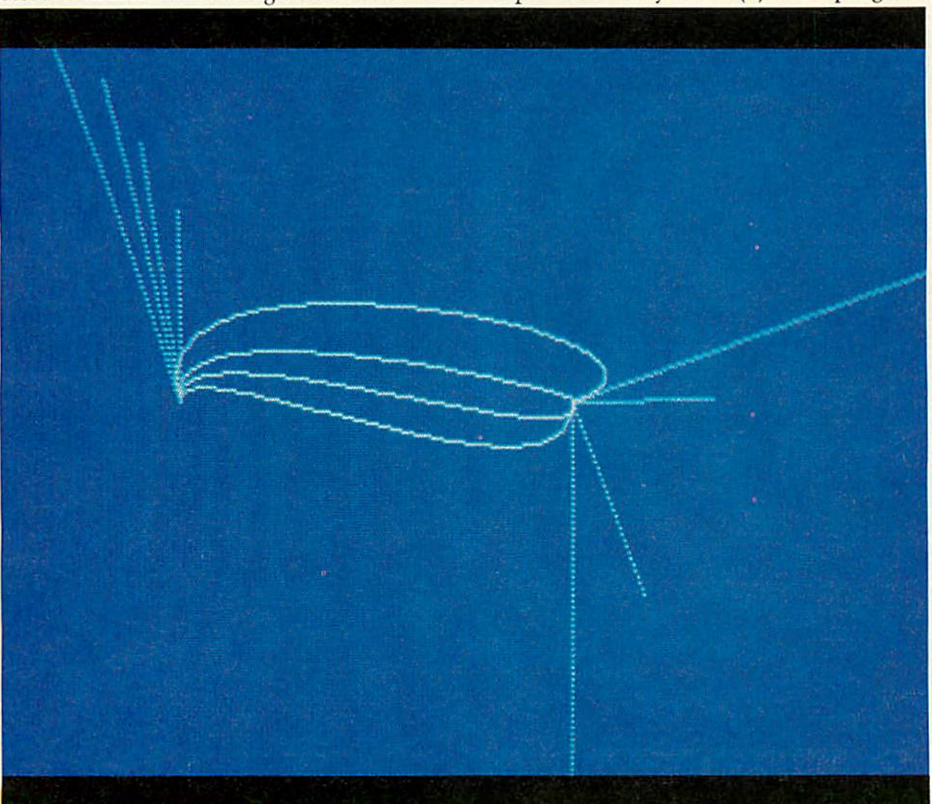


Figure 1. Family of four Bezier curves using the same start and end control points, but with different intermediate control points. The dotted lines lead to these intermediate points

Bezier surfaces

Bezier surfaces are formed by an extension of the ideas used for Bezier curves. Two parameters are required, and 16 control points are needed to define a surface.

We already know that four points are needed to generate a Bezier curve, so if we use four Bezier curves, all with the same parameter, we could generate four points by using a particular value of the parameter t, and then use them as control points for yet another Bezier curve. This curve would need to use a different parameter, which is called 's' in the program shown in Listing 2.

Figure 2 shows a set of sixteen points which are used to define a surface, together with a representation of the surface. Each point is represented by two of the subscripts in the array called (x) in the program.

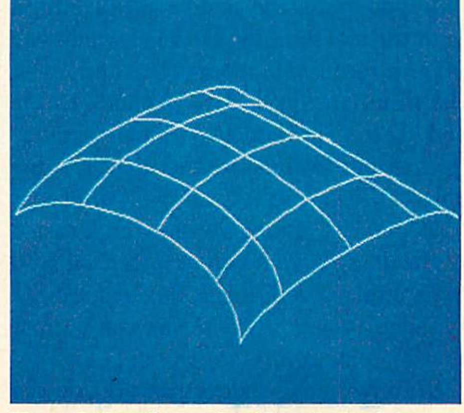


Figure 2. A surface using 16 control points

The view of the surface could be produced on a plotter by means of a minor modification to the program shown in Listing 2. Notice that, like the Bezier curve, the surface passes through the four corner points, but does not actually pass through any of the other control points. Each of these others defines only the tangent (direction) of the surface at the edge.

Listing 2 will draw a view of a surface on the screen. The surface is a curved sheet – the first view that is presented on the screen is the edge, and is not particularly interesting. But the information that is generated is stored in two arrays so that different views can be presented on the screen. It is interesting to modify the data statements to change the shape of the surface: each data statement gives the x, y and z co-ordinates of one control point. Complicated shapes can be produced, with changes being made even by moving one point.

The surface which is generated by the program is really a patch which can form part of a larger surface, so it is important to know how to join the patches together to form a single continuous surface. The basic rules are just like those for simple curves:

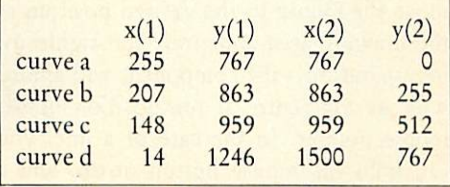
■ The control points at the edge of one surface must be the same as the control points at the edge of an adjacent surface.

■ If the surfaces are to meet without a sharp bend, the two control points on either side of the edges plus the one at the edge must lie in a straight line.

Extensions to this system

Bezier surfaces can certainly be used on microcomputers to generate representations of surfaces, though the BBC model B or Master aren't really fast enough to do it 'interactively'. With its much faster processing speed the Archimedes can do this sort of operation sufficiently quickly – the use of a mouse or joystick to change the values of control points in an interactive way would also be convenient, like the Welcome disc font designer.

In fact, a whole drawing package could be built around curves like these. Now you have all the mathematical tools you would need – *Acorn User* will be interested in the results of your efforts.



	x(1)	y(1)	x(2)	y(2)
curve a	255	767	767	0
curve b	207	863	863	255
curve c	148	959	959	512
curve d	14	1246	1500	767

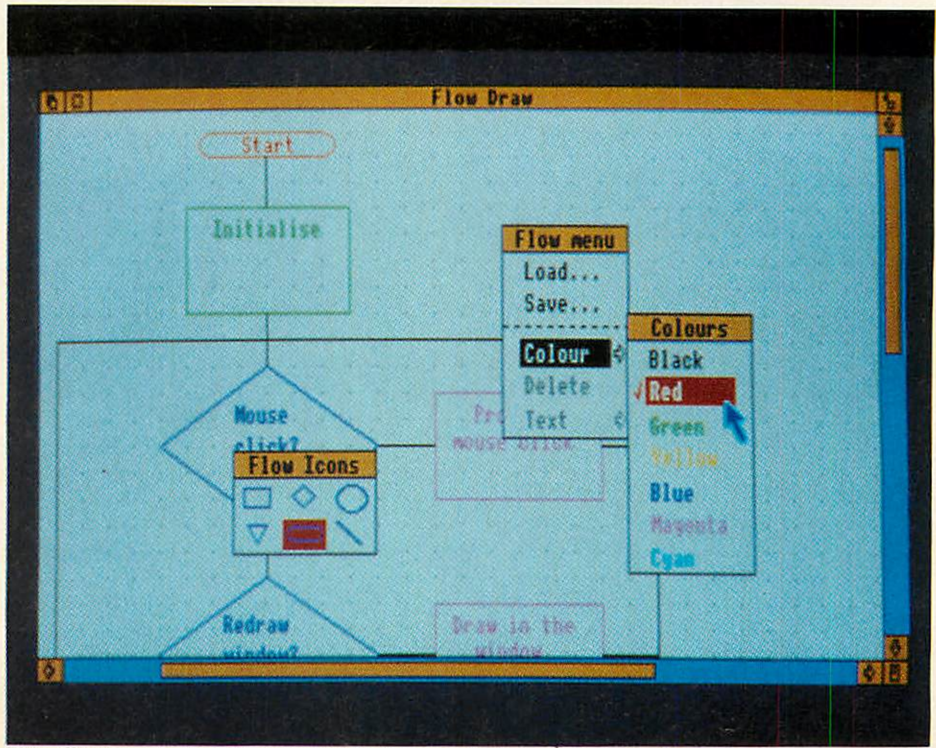
Table 1. Intermediate points for Figure 1 curves

GO WITH THE FLOW

We explain how to use icons and how to make full use of Arthur's WIMP interface



Chris Adie



Flow **allows you to draw flowcharts with full use of windows, icons and menus**

One of the key features of a window-based user interface is having icons and pop-up menus to drive a program, rather than an obscure command language. The Archimedes' *Desktop* program uses a few simple icons and menus, but much more sophisticated menus can be built up with Arthur's window manager. This article describes a simple computer-aided design program called *Flow* for drawing flow charts – the sort of diagrams sometimes used to design the overall structure of computer programs. It explains how to program both menus and icons within windows, so that you can start using windows, icons, menus and pointers in your own programs.

Listing 1 in the yellow pages is the '*Flow*' program. It runs under Arthur version 1.2, which incorporates the window manager version 0.18. Running the *Makeicons* program in listing 2 creates the necessary 'FlowIcons' file for *Flow*.

Arthur 1.2 and the latest window manager contain a few facilities that weren't available with the earlier versions described in the first article in this series, in the March 1988 issue of *Acorn User*. Some of these new facilities will be touched on here.

Operating *Flow* is quite simple. When you run it, two windows appear on the screen. The first is the 'Drawing' window, a straightforward window with two scroll bars and the usual control boxes along the top. It contains a regular array of grid points to which drawn objects will be aligned. The size of the second window is fixed, with no scroll bars or control boxes. It contains six icons, representing the kind of objects which you can put in the drawing or flow chart. These components are a rectangle, to represent an operation or process; a rhombus or diamond shape to represent a decision point; an oval to represent a start or stop; a triangle which acts as an off-page connector; a circle for a storage element, and finally a straight line to connect all the other drawing components together.

You select an icon from the Icon window by clicking on it with any of the mouse buttons. The background turns red to show it has been selected. Then you move the mouse to the desired position in the drawing area and press the rightmost mouse button – the component will appear with its top-centre at the position of the mouse pointer. In the case of a line, you can hold the mouse button down, and a 'rubber-band' line will be drawn from the selected point to the current mouse position. Release the button to fix the final position of the line.

If you press the middle menu button with the mouse in the Drawing window, a pop-up menu will appear. The options in the menu are Load, Save, Colour, Delete and Text. The last two initially appear 'greyed out' to indicate that they are disabled. Clicking on Load will display a 'dialogue box' asking you for the filename of the drawing you wish to load. Similarly, Save displays a dialogue box requiring a filename to use when saving the current drawing onto a disc.

With Arthur's window manager you can also have hierarchical menu structures. If you position the mouse over the little arrow to the right of the Colour menu entry, a second sub-menu appears. This allows you to choose the colour to draw in. A tick mark appears against the currently selected colour.

If you position the mouse pointer over a component in the drawing and click the Select button, the component starts flashing to show it has been selected. Now bringing up the menu, you'll find that Delete and Text are no longer disabled. Choosing Delete from the menu will remove the flashing item, whereas choosing Text allows you to type in some text to appear inside the drawing component.

If you read my previous article on the

Arthur Window Manager (*Acorn User*, March 1988), you will recognise the essential features of the program. The drawing window is created as normal with the Wimp_CreateWindow SWI call. Notice that with the Arthur version 1.2 ROMs in the machine, you don't need to specify the actual SWI call number – you can just use the name. Basic uses another SWI, OS_NumberFromString, to convert the name into the appropriate number before executing the desired SWI instruction.

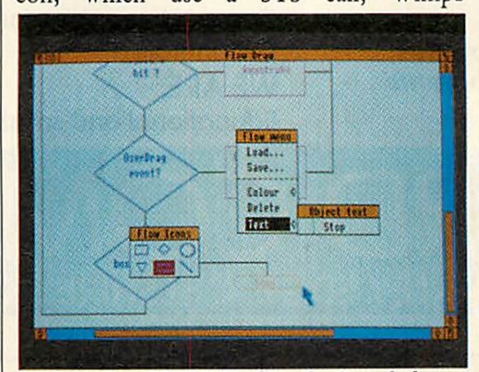
Before I continue, a quick note on terminology. If you have the Archimedes Programmers Reference Manual, you'll notice that Acorn calls the logical work area of a window the 'work area extent', and the physical work area the 'visible work area'. This article uses the original terms used in the March article. It's probably worthwhile reading this again to remind yourself of the overall structure of the windowing system.

The Icon window

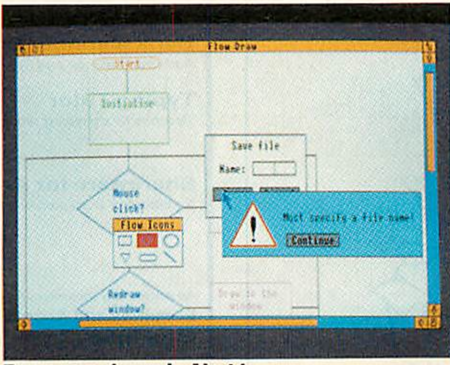
The Icon window is rather different from the Drawing window. Each icon appearing in it is a sprite, and the file 'Flowicons' contains these sprites. They were originally created with the Archimedes Sprite Editor from the welcome disc. The file is loaded using *Sload, and after the Icon window has been created, SYS Wimp_CreateIcon is called for each icon, with R1 pointing to an icon data block. Table 7 on page 59 gives the format of an icon data block (this continues the table numbering from the March article) and the icon flag word which is contained in the data block is explained in Figure 5. Notice that PROCcreateicon fills in the top byte of the flag word with the appropriate icon colours, which are passed to it as separate parameters.

The icon flag word that is used for the components in the icon window is &00003022. Bit 1 of this 32-bit word indicates that the icon is a sprite, while bits 12 to 15 are 0011 in binary, meaning that you want to be informed whenever the mouse buttons are clicked over the icon. Bit 5 indicates that the icon should be drawn with a 'filled background'. This means that the box defined in the icon data block should be filled in with the background colour described in the top four bits of the flag word before the icon itself is plotted. Because most of the icon is 'transparent', the background colour 'shines though'. Some of the other bits in the icon flag word are meaningless for sprite icons, but you'll see later how to use them with 'text icons'.

Bit 4 of the window flag word, passed to PROCcreatewindow, is important. If it is set, the window manager knows that it alone is responsible for redrawing the window, and the program never gets a request to redraw it from the Wimp_Poll routine. However the program is still told when there is a mouse button click in the window, and block!16 in the data block returned by Wimp_Poll tells you which icon was clicked on. In the *Flow* icon window, the program then changes the background of the currently selected icon back to white, and makes the newly selected icon appear with a red background. This is done with PROCselecticon and PROCdeselecticon, which use a SYS call, Wimp_SetIconState, to change the icon flag word. Once an icon is defined, you can't change its position or contents, but you can alter its flag word and background colour.



Text can be added to the flowchart symbols



Errors are shown in Alert boxes

The Wimp_SetIconState parameter block contains the window handle, the icon handle (which is just the number of the icon in the order of creation, counting from zero), and two words at block!8 and block!12 which between them control which bits of the icon flag word are to be affected. The new flag word will become:

(oldfw AND NOT block!12) EOR block!8

This is rather like the way many Osbyte calls work in the original BBC micro, except that the mask word in block!12 is inverted before being combined with the old value. Note that you can't read the icon state with this call – there is a separate call, Wimp_GetIconState, for this. Calling Wimp_SetIconState automatically results in the icon being redrawn on the screen if it is visible in the window.

Creating objects

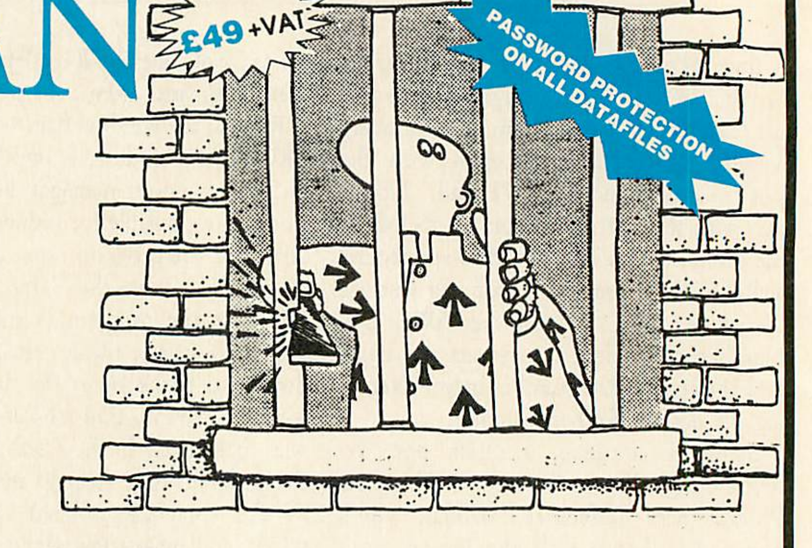
When you press the right-hand mouse button to create an object in the drawing window, *Flow* makes an entry in the 'object table'. This is an area of memory reserved with DIM, big enough for 50 objects. Each object occupies 88 bytes in the table. For all the different kinds of objects, rectangles, lines and so on, the table stores the object type (as a text string), the mininum and maximum x and y co-ordinates relative to the window's logical work area origin, and the text string (if any) to go inside the object.

The object table also contains information specific to the different kinds of object. For instance, the table entry for a circle contains its radius, and for a triangle it contains the triangle's side length. Although these values are the same for all circles and triangles in this version of *Flow*, these values are included to make it easier to extend the program to handle drawing components of different sizes.

When you click the right-hand Select button, PROCaction calls PROCclickwindow, which checks whether the mouse is inside the Draw window – it calls PROCclickdrawin if it is. This procedure verifies that it was the right-hand button, and then calls PROCcreateob. This is where the real work starts. It works out the nearest grid point to the mouse position (using PROCgetmousedrawwin), then makes a partial entry in the object table. It then calls a function specific to the type of object to complete the object information table entry, for example FNcreateobbox. Creating an object does not in itself cause it to appear on the screen – instead PROCcreateob calls Wimp_ForceRedraw, indicating the rectangle surrounding the new object needs redrawing. When the application calls Wimp_Poll again, it receives a redraw request in the usual way, and the new object in the object table will be drawn along with any others which appear within that rectangle.

PROCredrawwindow is responsible for handling the redraw request. It works in

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essentially the same way as the scheme described in the article in the March issue, except that in the 0.18 version of the window manager present in the Arthur 1.2 ROMs, the Basic ORIGIN statement can be used to make the graphics window origin and the window's logical work area origin the same (even if the logical work area origin is not visible in the window or even if it is off screen). This makes things much simpler, and PROCredraw is now almost the only procedure that has to take account of where on screen the window really is, and of how big it is. It calls PROCredrawwin, which draws the grid points and goes down through the object table, entry by entry, testing whether each object appears in the rectangle being redrawn. If it does, then PROCdrawob is called. This routine selects the appropriate colour (flashing if the object is the currently selected one), and then calls a routine such as FNdrawobbox which at last draws the object.

LOCATION	CONTENTS
block!0	handle of window to create icon in
block!4 to block!16	location of icon relative to window's logical work area origin block!4 = xmin, block!8 = ymin, block!12 = xmax, block!16 = ymax
block!20	icon flag word
$(block+24)	icon data (eg. name of sprite) up to 11 characters + Return

Table 7: structure of the icon data block

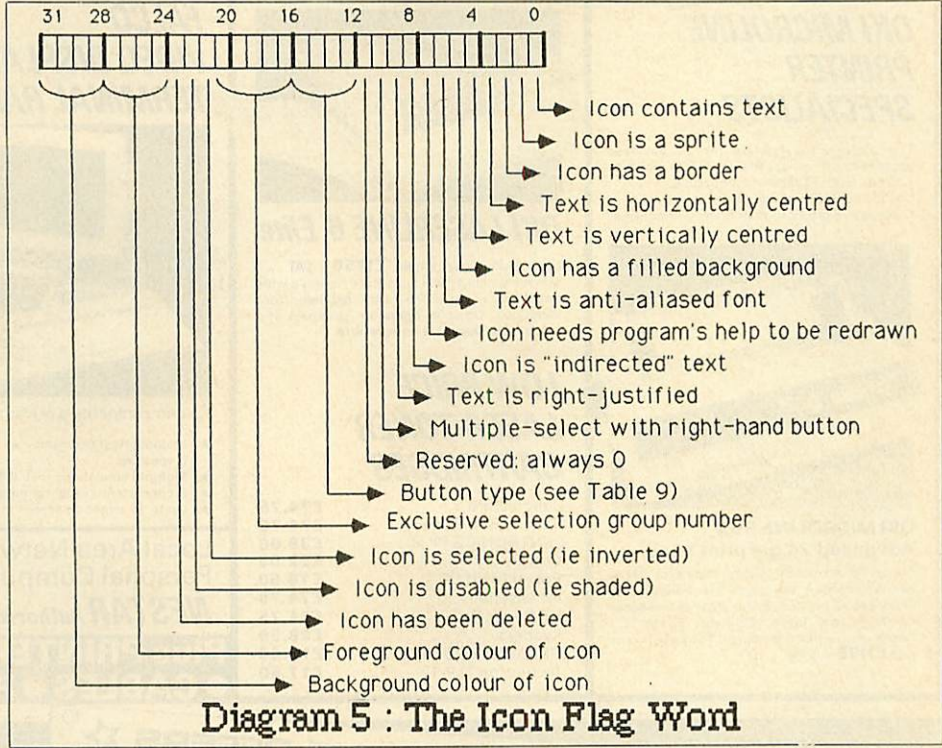


Figure 5: meaning of the 32 bits in the icon flag word

Dragging

Things are a little different when it comes to creating a line object – this uses the window manager's 'drag box' facility. When FNcreateobline is called, it invokes Wimp_DragBox. The parameter block for this routine is shown in Table 8 on page 61. There are three types of drag box operations that you can use, numbered 5, 6 and 7. Types 1 to 4 are used internally by the window manager itself. Type 5 will drag a box of fixed size around the screen as you move the mouse pointer, as when you move a window in the *Desktop* program. Type 6 causes a box, with one corner fixed and the opposite corner joined to the mouse pointer, to be drawn, as when you resize a window. *Flow* uses type 7, which does not actually cause a box to be drawn on screen at all. This type of drag operation does not need an initial box position in block!20, it just takes a parent block position in block!24 to block!36, which defines the area on screen within which the mouse can move. *Flow* sets this to the current outline of the Drawing window so that the mouse can't drag an item outside the window.

Flow itself is responsible for drawing the dotted line from the start to the point nearest the mouse position. While dragging is active, the string variable claimdrag$ is set to "line", and every time that Wimp_Poll returns an event code of 0 (that is when nothing happens), the routine FNdragline is called. It draws a dotted line in the old position in EOR mode, to erase the old line, then draws the dotted line in the new position using EOR again. This is one of the few situations when you can draw on the screen without having first received a redraw request from the window manager. If another window (for example the Icon window) happens to overlap the Drawing window, the dotted line will overwrite it. But because you are using EOR drawing, everything will come right again when the line is plotted a second time. But of course, it relies on nothing happening in the overlapped window while the line is being dragged. In this case, nothing can happen, because releasing the mouse buttons ends the drag.

If Wimp_DragBox has been called, eventually the window manager will return an event code 7 from Wimp_Poll to the program. This 'User Drag' event shows that all the mouse buttons have now been released, so the dragging has ended. *Flow* calls FNuserdragline, which erases the dotted line and completes the tentative entry in the object information table originally made by FNcreateobline. It also forces redrawing of the area surrounding the line, so the line will finally be drawn in by FNdrawobline when Wimp_Poll returns the redraw request.

Dialogue boxes

A dialogue box is simply a small window without a title bar or scroll bars. Typically, it contains text and sprite icons, with perhaps some 'text entry fields'. There are usually also one or more 'buttons' you can click on with the mouse. The Load and Save options from *Flow*'s main menu both use dialogue boxes.

A dialogue box usually has no 'user graphics' – that is things drawn by the

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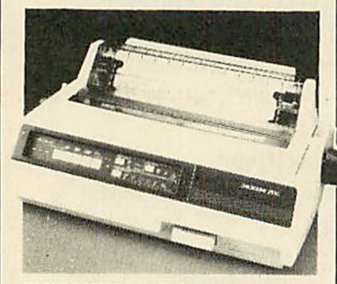
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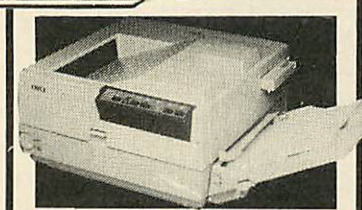
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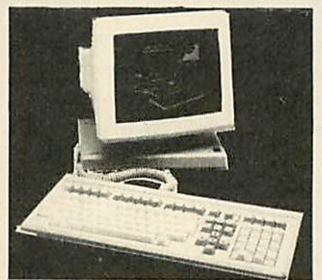
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program – so once it is created and opened, the window manager can look after drawing it all for you. Everything that a dialogue box contains is an icon. You've already met sprite icons, but other icons can also be textual, depending on what bits are set in the icon flag word.

FNcreatedialog is the routine which creates and opens a dialogue box on the screen. Because the number of parameters which need to be passed to this function is variable it is easier to pass them using a DATA statement. When FNcreatedialog is called, it expects the data pointer to point to a number of string type data items upon which it can use READ and EVAL later.

The first four data items are always the same. The first is the identity of the 'owner' of the box – a string which is assigned to claimdialog$ which indicates which routine to call when a mouse click is detected in the dialogue box. The second is the number of icons in the dialogue box, and the third and fourth are the overall width and height of the box. There are then several more DATA statements, one for each icon in the box, each with eight items of data which are read and evaluated to give the parameters necessary for PROCcreateicon.

All FNcreatedialog has to do is to create the window, then read the parameters for each icon and pass them to PROCcreateicon. Finally it prevents the mouse moving outside the dialogue box – this forces you to use the dialogue box before you can do anything else.

From the way that FNcreatedialog works, you can see that as far as the window manager is concerned, the dialogue box is just another window. It is how you use it that makes it a dialogue box.

Text icons

As an example, let's look at PROCquit, which is called when you click on the close box of the Draw window. It pops up a dialogue box with a stop symbol in it, asking you if you are sure you want to finish. There are two buttons – Quit and Cancel. The 'stop' icon is quite straightforward; it's a sprite from the 'flowicons' file. But all the other icons, including the buttons are 'text icons'.

The prompt 'Quit Flow?' has an icon flag word of &00000019, with bits set at bit 0 (making it a text icon), bit 3 (meaning text is centred horizontally within the boundary box defined in the icon data), and bit 4 (which means that the text is centred vertically too). The text must be no more than 11 characters, and should be finished by a carriage return. It is stored in the icon data block from block!24 onwards.

LOCATION	CONTENTS
block!0	handle of window
block!4	drag type 5 - fixed size box 6 - rubber band box 7 - invisible box
block!8 to block!20	initial box position (screen coords) block!8 = xmin, block!12 = ymin block!15 = xmax, block!20 = ymax
block!24 to block!36	parent box position (screen coords) block!24 = xmin, block!28 = ymin block!32 = xmax, block!36 = ymax

Table 8: parameter block for Wimp-Drag Box

BUTTON TYPE	MEANING
0	ignore click on this icon
1	notify program if pointer over icon
2	notify program on click (auto-repeat)
3	notify program on click (debounced)
4	click selects, notify program on release
5	as 4, but notify on double click
6 to 8	as 3-5, but can also drag
9	select when pointer over icon, notify program on click
10	click, drag or double click
11 to 14	reserved
15	writeable icon

Table 9: button types set in the icon flag word

The buttons are very similar, but they also have bit 2 set, giving them a border, and bit 5 set to give them a filled background. They also have bits 12 to 15 set so that the program is told by the Wimp_Poll routine when you click the mouse button over them. All the possible values you can put in these four bits are listed above in Table 9.

When a mouse click is detected on one of the buttons, PROCclickwindow will call PROCclickdialog, which in turn calls FNclickdialogquit – because 'quit' is the owner of the box. FNclickdialogquit inverts the colour of the button to provide some visual feedback, even if it's only visible for an instant. If it was the quit button, everything is shut down and the program terminates. If it was the cancel button, PROCclickdialog closes the window and resets the mouse rectangle to allow you to roam over the whole screen again.

Icons can contain up to 11 characters of text. But what happens if you want to display more than 11 characters of text in a dialogue box? The answer is to create an 'indirected text icon'. If bit 8 is set in the icon flag word, the twelve bytes starting at block!24 in the icon data block that would usually be text are treated differently. With indirection, the address at block!24 is interpreted as the address of an area of memory containing the text to be written, and block!32 is the length of the text: block!28 must always be &FFFFFFFF.

In *Flow*, this technique is used to write the message in an alert box, a simple form of dialogue box when the program needs to display an error message. The message is passed to PROCcreatealert, and can be up to 80 characters long. For example if you try to load a file using the Load dialogue box, but without giving a file name, you'll get an alert box with a message informing you of your error.

Note that when you click on the alert's Continue button, the mouse will revert to being restricted to the area of the old dialogue box, to allow you to type in the



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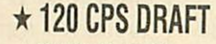


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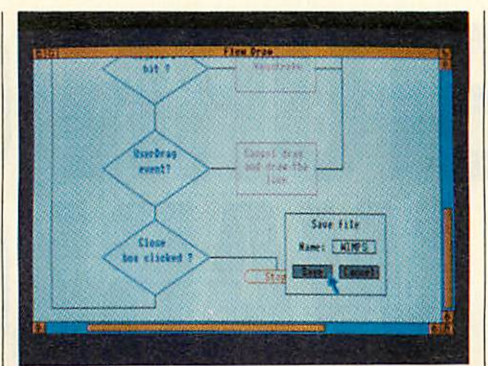
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name. This is why the program used PROCmouserectangle to set and record the mouse's area of movement, so it can be restored to what it was before. Under the current window manager, there doesn't seem to be any easy way of reading the current mouse rectangle.

As well as sprite and text icons, you can also have 'writeable icons' – these are simply icons which you can type text into. The Load and Save dialogue boxes use icons you can write on for typing in the filenames. In fact, these icons are very similar to an indirected text icon, but with a button type of &F (see Table 9). They normally have a border too. In order for the keystrokes you type to appear in the icon as characters, the program must place the caret (the tiny vertical text cursor) within the icon. So the program can do this, it calls Wimp_SetCaretPosition with the icon handle in R1 and the caret's position within the string in R5.

Any text already written into the indirected data block when the icon is created will be displayed when the icon is drawn. So there could be a default – perhaps the last filename used – already within the icon, ready to be edited or replaced.



Same dialogue box uses a writeable icon

If there are several writeable icons within the dialogue box, clicking the mouse on one will automatically cause the caret to be moved to that one. Characters typed at the keyboard will automatically be drawn in too, without the program having to do anything. Several keys can be used to edit the text too – the left and right arrow keys move the caret, Delete removes a character behind the caret and Copy removes the one in front. The window manager doesn't allow more text than will fit to be entered, according to the text length given in block!32 of the icon data block.

When it needs to, usually when a mouse clicks on a button meaning okay or close the dialogue, the program may read the string from the indirected icon data, and use it as a filename or whatever.

Last words

Many people who are used to writing 'ordinary' programs find that programming the window manager is quite exacting, a bit complicated and very different from what they are used to. Perseverance is required, but your reward is a much more user-friendly program. Be grateful you don't have to program for GEM or Microsoft's *Windows* – Arthur's window manager has about 30 different calls, but *Windows* uses about 500 separate functions. *Flow* is a lengthy thousand lines long, but it has many of the functions of commercial drawing programs like *MacDraw* or Microsoft's *Windows Draw*.

You now know how to make the Arthur window manager jump through most of the hoops. You can make a start on making your own programs using the WIMP interface. Next month, I'll cover the menu system and why there is so much use of EVAL in *Flow*. Plus there'll be a few ideas on how to extend the flow-charting program.

RETURN OF THE WARLORD

All aboard the Cubix for another trip in space-time. This month we explore how *The Warlord* works and how the game was created

Peter Voke

If you ordered last month's disc, you will probably have already started part one of *The Warlord*, the text adventure on that disc. This month's disc contains the three overlays for part two. Transfer these onto your *Warlord* disc, ready for when you need them.

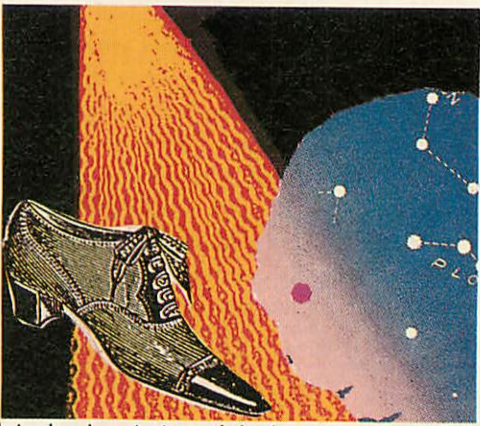
The script for *The Warlord* arrived through my front door just as the adventure generator program that was to turn it into a final working adventure was being finished. The program is called TAG, the Tabular Adventure Generator. Also there were a series of post-processing programs to compress the original text by a factor of almost two.

TAG is essentially a compiler. Like a Pascal compiler, which takes a program and turns it into pseudo-machine code for a non-existent microprocessor, TAG takes TAG source language (TSL) progams and turns them into adventure pseudocode, a highly compressed code that specifies the structure of an adventure in as little space as possible. Since there is no microprocessor that runs the pseudocode directly, an interpreter written in 6502 machine code is needed to carry out the actions of the Pascal program or run the adventure.

TSL is a language for writing adventures. *Warlord* was written in it and compiled using TAG. It is interpreted by the TAG interpreter as you play the advenure.

Since I was working with a BBC micro, it was convenient to make TSL look as much like Basic as possible. I could then use the unbuilt edit functions of the BBC, including the cursor keys, to create the program just as I wanted it.

If you have played *Warlord*, you may be interested to see some of the more familiar bits of it in their original TSL form. Here



is the description of the location where the Cubix is (if you haven't found it yet, look around):

```
320 W"you are surrounded by swirling
fog.an enormous blue cube stands before
you." IF P'36=02 (W"the door is ajar.")
```

The W is compiled into a single byte instruction which causes the subsequent text to appear on the screen. The phrase IF P'36=02 is compiled to the three-byte sequence &A1 &36 &02, and causes the interpreter to test one of the internal variables (called parameters), in this case parameter number &36. If it has the value 2, the text in the brackets is printed.

If you do something silly in *The Warlord*, it does not just reply 'You can't'. Every verb has its own default reply. You may like to discover the default replies to jump, eat, swing, speak, think and throw. There is a part of the original program dedicated to each verb. One of the first things people do in *The Warlord* is to use the radio – or try to. Here is the part of the default action of the verb 'use', which applies to the radio:

```
1180 IF N1="RADIO" (IF P'26›20
(W"the radio batteries have run out."
RETURN) IF P'35 z (W"it's switched
off." RETURN) IF P'00›L"M92" OR
P'36/01 (W"you hear nothing but
hissing static." RETURN)
1190 W" ^tim^ trevyl's voice replies:
^hello!where have you been? lost in the
fog?the easiest way to find the^cubix is
to go to the tall tree, and move
southeast.i'll have the door open for
you." P'36+ P'1C]+02 RETURN)›
```

You can guess from this that parameter &26 has something to do with the radio batteries running down. Parameter 0 is actually the current location number, so P'00>L"M92" is a way of checking that the player is in the right part of the adventure to be able to contact Tim. In this case, you have to be upstream of location M92, which is the bridge. To contact Tim, parameter &36 must also be zero, and as this is set to a non-zero value by P'36+, it is not possible to talk to Tim twice. P'1C]+02 adds 2 to the value of parameter &1C, which happens to be the score.

This gives you some idea of both the power and the complexity of writing an adventure in TSL. In addition to the parameters, which play an important role in controlling the overall action in the adventure, there are eight flags associated with each location, called Fa, Fb . . .Fh. Some of these have special functions. For instance, Fg keeps track of whether any objects have been taken from or dropped at that location. The TSL source code for the actions that take place at a familiar location, the haystack, is as follows:

```
260 DEF L="F56"
270 LET Fg[#
280 IF MN:L]"B38"
290 IF ME:L]"R1"
300 IF MW:L]"F55"
310 IF MS:L]"M74"
```

320 IF V="SEARCH" (P'25+
330 IF P'25=01 (W" in the haystack you discover a silver button marked with the head of the king.: "SILVER"]p p'1c+: RETURN)
340 IF P'25=02 (W"you search deeper and uncover a tiny needle among the stalks.": "NEEDLE"]p p'1C+ RETURN)
350 W"achoo! hay dust is getting up your nose.")
360 END

If you have picked up any idea of how TSL reads, this will be enough to give the game away as far as the haystack goes. If the input verb is 'search', parameter &25 is increased by one. The first time, you will find a button, the second time a needle, and if you persist in searching deeper you will merely get hay fever. The part reading "SILVER"]p means move the object named silver to the present location. This compiles to a two-byte code, and makes the silver button appear in the location description: 'There is a silver button here'.

Other parts of this 'local action' program preset the 'g' flag and tell you where you can move to from the haystack. IF ME:L]"R1" is the move eastwards to the location called R1. This compiles to two bytes, the first of which means 'if the input is e or east or something equivalent' and the second which tells the interpreter to move the player to R1.

By now, you will realise roughly how the adventure works. As the player enters a new location, the interpreter picks up the compiled location description, acts on the instructions found there (which will mostly be text output) and sets the 'd' flag so that the short description will subsequently be given instead.

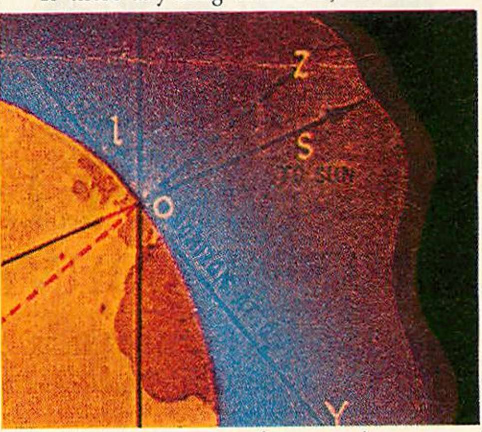
It then prints the arrow prompt and waits for input. A parser splits up the input into a verb, up to two nouns and a connection word like 'to', 'on', or 'with' (adverbs like 'quietly' also count as connection words). The words are identified by looking them up in the verb and noun dictionaries and tagging them with identification numbers, which are put into parameters &10 to &13.

The interpreter now uses several sections of compiled code in turn. First it goes to a short global action section which is always performed regardless of what the input is, or where the player is located. This checks up on odd inputs like 'get on hovercycle' instead of 'mount hovercycle', and handles counters like the radio batteries or the Cubix fire. These are the things that can happen anywhere, or must happen everywhere.

Usually nothing much happens as a result of the global actions, and the interpreter proceeds to the local action section for the location the player happens to be in. This is the most important part, dealing with the things that happen only in specific locations, such as searching the haystack.

If no output has been produced by either the global or local action, the interpreter jumps to the verb default, printing out either something important, or, if all else fails, the default reply for that verb: 'bizarre', 'how cute', 'a lot of good that will do you', or whatever. There is also a second global action section that is called after everything else is finished.

Is there anything else? Yes, there is the



text that comes out when you inspect an object or it appears in the inventory. The former is dealt with by the default for the verb 'inspect' ('examine' is equivalent). The latter, however, is kept in a separate TSL program called the object descriptions. Here is the TSL for the description of the lamp:

360 DEF N="LAMP" c] "CL1"
370 IF p'33›02 (W"a flickering") ELSE (W"an unlit") W"lantern" END
380 DEF N= "LANTERN"= "LAMP" c

Even though it is one of the more interesting nouns, in that the description does vary a bit according to whether the lamp is lit or not, it is still short and simple.

If you are one of those people who love taking progams to pieces, you may like to know where the various parts of *The Warlord* are kept. The interpreter resides between &1100 and &1A91. The location descriptions are always at &1B00 in each overlay, and the local actions are from &2B00 upwards. The object descriptions start at &3C00 (they are not overlaid, of course) and the verb defaults at &3E63. If you look in memory for words, however, you are not going to find any, since the text has been compressed. Try adding &30 (48) to the contents of every location, and a few words will appear, along with the apparently meaningless garbage. The words you see are those that have not been compressed, since they only occur once in the whole adventure.

Any word that occurs more than once has been replaced by a one or two-byte text compression code. The most frequent 200 words are replaced by a single byte in the range &32 to &F6. About 1200 other words that occur more than once in the adventure are replaced by two-byte compression codes. The first byte, which is in the range &F7 to &FF, tells the interpreter which of nine dictionaries to use, while the second byte says which word it is.

The dictionaries are stored in *The Warlord* from &546B up to &7BFF. They occupy more space than anything else, yet paradoxically save more space too. Again you will not see much if you look in this part of memory because the dictionaries themselves are compressed by a different technique. Any occurrence of the letters a, e, i, o, r, t, or n in a dictionary word is combined with the previous letter into a compound two-letter single-byte code, saving nearly 30 per cent on the dictionary size. The highest part of memory is given over to the verb and noun dictionaries. Connection words are stored with nouns in the dictionary.

TAG compresses whole words, and only compresses common two-letter syllables within the dictionaries. The result of this strategy is that spaces have been almost completely eliminated from the text. Whenever the interpreter finds a compression code within the text, it knows there should be a space before the word it stands for and a space after it, unless it is immediatley followed by a punctuation mark. The interpreter automatically puts these spaces in, making sure that two spaces are never output in succession, splitting the sentences neatly at the end of the 40-character screen width, and putting capital letters after full stops.

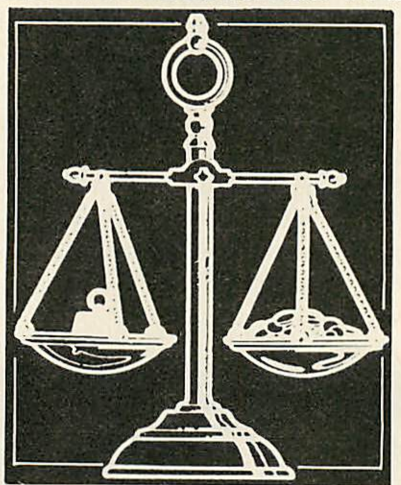
You may have noticed in some of the TSL above that the words Tim, Trevyl and Cubix all occur with a forced capital trigger byte in front of them: ^tim, ^trevyl and ^cubix. Although this looks wasteful, remember that these words occur more than once in the text and will therefore be put into compression dictionaries. The extra ^byte, forcing a capital, will only be stored once in each case, in the dictionary, and in





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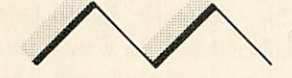
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those words where it is followed by the letter 't' this will actually be omitted with the^. So there is not as much waste as you might think.

Within text, the byte values 0 to 5 are reserved for special purposes, values 6 to &10 are punctuation marks, &11 to &2A are the letters a to z, &2B to &31 have special functions like printing numbers, &32 to &F6 are one-byte compression codes, and &F7 to &FF are the first bytes of two-byte compression sequences.

Outside text, the values encountered have quite a different set of meanings. Byte values greater than &7F (negative bytes) test conditions such as 'is parameter so-and-so greater than the following value?' or 'is the location number equal to such-and-such?'. With as many as 128 bytes to choose from, it is possible to have bytes that test, in many different ways, the verb, either of the two nouns, the connection word, parameters, named objects (which, like the nouns, can be worn, carried, present, or tested for being in any named location), moves in 16 possible directions, and the eight flags for the current location, which can be set or unset. As you can see, this covers just about any possibility you could conceivably imagine.

The byte values less than &80 (positive bytes) cause the interpreter to do something, rather than test a condition. It is possible to change the verb or noun numbers, move objects, manipulate parameters or flags, and perform a number of text output functions, including reflecting the input words back to the player. In addition there are 16 special actions, each with their own code, performing the functions that, in Basic, would be done by LOAD, SAVE, RUN, INPUT, END, and so on.

I have probably confirmed your opinion that the production of really slick adventures is a very complex business. This hides the essence of the adventure business, which is that technical sophistication is an optional extra. The truly essential ingredient is an original plot and high-quality text, and for this a simple adventure generator will do just as well as TAG. Next month, *Acorn User* will introduce a very simple interactive adventure generator, which allows you to create an adventure while you play it. Though very few of the functions of TAG are there, it is still possible to write beautiful adventures even with the simplest aids.

In the meantime, here is a quiz for those of you deep into *The Warlord*. A small prize goes to the first person to send the correct answers to these 14 questions to the *Acorn User* offices. There is no time limit.

1 With what can you play an adventure inside the adventure?
2 Who forgets to make his bed?
3 What colour are the eyes of the bandit chieftain's long lost love?
4 What does the folder of matches advertise?
5 What do hunting eagles prefer rather than humans?
6 Who ignores complaints about Catch-22?
7 What is the copyright message in the adventure?
8 Where are you when you hear of Quinn and Smith backwards?
9 How much does a loaf of bread cost in Charleroi?
10 Who is vain about his beard?
11 Who rises to the rank of general, and in whose army?
12 What does Bernard Saxe-Weimar capture at Quatre-Bras?
13 Who wears sky blue britches?
14 What is the last cry of the green minion?

MORE WARLORD HINTS

```
Q: I GOT EXECUTED FIRST AND INTERROGATED AFTERWARDS
H: P1=M3[72C@T96FK7*M6AM-0
A: ;C[#>Q3AO7T71=M3[96FK'HQ)ER#E9Q:9M=:&

Q: I CEASED TO EXIST
H: [1A;C3]>"CAIC3[96FK0B3N@M!MKG"S?@;?E\
A: =K?Y-L5>2[44=[$AQ3:B["CAIC3[44=[%I6+

Q: WE GET EXECUTED AS ENGLISH SYMPATHISERS
H: GAEL!_.;:B[0<5BB[4;Q(9M9Y!Q=F96+
A: R6FK-H>AL'>OL/F?L/7Z#E9Q:9M=:W&;RA[

Q: BOOM! THAT WAS SILLY OF ME
H: ;CNAL.AEL4;Q"C[44=M3[71=IR)KL'H6NM5;_
A: I<5BB[!_&O>2'4!M6\'>OL/F?L&;RA[

Q: WHERE CAN I FIND A FUSE?
H: O/MGG#ICD2[4;Q44=[-4HER':S1K?DA[
A: M4=[R\6\41IFL.ACB4X/7Z44=[':S1*

Q: I KEEP GETTING IMPRISONED IN THE PIGSTY
H: M49SL$K6N;Y-L-8<MR96FK(9U/[4;Q3A-XV
A: M4J3@[63J6K?Y444J3@[%NO>O5[2=F?1N\

Q: I NEED TO GET BACK PAST THE BANDITS
H: :U9:;\44=H_4/CN-4J:[44=HS!U9:;\96FZ
A: @HQ638_44=[2/U3E7'4/CN5>2[44=[,5M5B*

Q: NOTHING I DO SEEMS TO CONVINCE THE SERGEANT
H: L<>8[05JA<9[!Q3[*K>AL,=B:[449S[
A: =K?Y-L78C@G"%%NO>O5[&L=>S44=[41IF[

Q: WHERE CAN I FIND SOME SNUFF?
H: G7<QN44=[-4HER':S1K?DA[
A: M4=[U_4X41IFL.ACB4X/7Z44=[':S1K?DA[

Q: I SNUFFED IT
H: M1<BEX96FK4;Q(9M9Y!Q=F96+
A: @HQ.ACB4X!EN1MN5>6E9Y44=[3;G1@)

Q: SOME SAPPERS TRY TO PICK MY POCKETS
H: P1QG-<>ALL44=TG"C[)ER44=[-8N@M41IF+0
A: M4=TG!Q3[(M99KGU2'BM/[44=HS3<>8["C@A)

Q: WHAT CAN THE SAPPERS DO FOR ME?
H: E9OL96FK4-J:[3<>8[,=>ALL23G=<A)
A: E=>ALL!_4-O5MN!SL44=DIN"P/Y/<M]

Q: MY FINGERNAILS ARE TOO WEAK
H: =E;\96FK&CE6\!MK;4AE9Y(=M3:0
A: M-J:[44=[0<5S1[&CIAA[

Q: I CAN'T AVOID BEING ROBBED AT LEAST ONCE
H: ;S?L44=TG!Q3[6/MGG#>Q3G9N@M"?M6EK?NN
A: :MK;4AE9Y44=TG3A1<KT)JM)ER44=[1D,Q@GV

Q: I AM SEEN EASILY AGAINST THE FLAMES
H: ;CO@1MN.AEL4;Q"C[32@I^4.Y^NAL01R,0
A: AA;A[596AMN44=[7*FH?R44=M3*

Q: I HAVE BEEN DESPATCHED BY A VETERAN
H: R6FK.7@?\3<>8[+>E6\/7Z7.<O??!
A: AAKL(ADS72K4X44=[09JA;=#

Q: THE CUIRASSIER SEEMS TO BE A LIGHT SLEEPER
H: L<Q96FK"C[!_,=>ALL44A<A)
A: @>OL44=[4-O5MN3<7N8MV

Q: I SEEM TO HAVE CUT IT RATHER FINE
H: M4=M3[)JM-BC3[449MR/?7[7*XG/F?[
A: @HEL44=["?X6?7O+!#R?L44=[41IF[

Q: WHAT DO I DO WITH THIS SMALL DEVICE?
H: R6FK23<K@MG-H>AL01XG!S@1IF5F?!
A: BEE=5>QL)KX4B1A;C3]J4F:%S85M7D8IFMN

Q: WHERE CAN I FIND SOME BEEF?
H: GAEL&;QN&L=>S44=[-4HER':S1K?DA[
A: M4=[T 4X41IFL.ACB4X/7Z44=[':S1K?DA[

Q: GOING THROUGH A HOLE DOESN'T GET ME VERY FAR
H: M4=M3[!Q3[/?>MG4C8Q0<5BBNM4;Q'H
A: M>7<?\44=[41IFL4;Q44=[3<F?470

Q: I SEEM TO HAVE LOST A BAYONET - AND A PISTOL
H: :Q3[96FK3B=3[96FK.7@?\44=H20
A: M4=[&L3I5EX4-J:[44=H"
```

Continued ►

◀ Warlord hints continued

```
Q: I GOT SQUASHED TO DEATH BY FIFTY FURIOUS FRENCHMEN
H: =KQ96FK(9U/[!MK;4AE9Y4;Q-4S/EX449S+0
A: ;S=<R44=["P7;C>[5>6E9Y44=[-4S/E=N\

Q: I GET KILLED WHEN THE POWDERSTORE GOES UP
H: HG/MN44=[(AC@GM!M6*@@A
A: N>2[!_&O>2'4!M6\'>OL&O=B4=MN!V*XV

Q: I CAN'T GET THE MUSKET - OR THE BAYONET
H: @>IF8MG$K6NM)KZ2449SS,M44=[7*XV
A: M-J:[44=["?X6?7OL'>IF8MGH&AEL-H>8:OUF

Q: FIRING THE PISTOL DOESN'T GET ME WHERE I WANT TO GO
H: O/O1M/MEM5>2[)KL"?BHL*Q2O\
A: AAKL44=[6/O1M/MR72K4X)K[

Q: I TRIPPED AND GOT DUMPED IN THE PIGSTY
H: M;Q%Q/MG;4AE9Y44=M3[)JM!_32<R<?!
A: ?CE7[M3"S?L'>OL!K@T96FK.7@?\&CIAA[

Q: WHERE CAN I FIND SOMETHING TO LIGHT GUNPOWDER?
H: AAJA;CGG)JM"S9=$
A: IE7@T44=["S9=U)ER44=[09>LAEV

Q: I GOT BLASTED INTO ATOMS BY A MESON BEAM
H: BD4FBE7[96F=N.3L8[)JM-!2!K=&
A: AAKL44=[7*Q:CC2#,M(=I5EE4M!

Q: HOW DO I GET OUT OF THIS EMPTY TENT?
H: M4AJM0B=3J9HS)JM!_'HC2E8MR+CAE[
A: R6FK.7@?\44=["?X6?7OL4;Q#R?L44=[41IF[

Q: I GOT FROZEN TO DEATH IN A BATHROOM
H: FBDAL05JA<9[$K?Y-L,=B:[#L=8\"?S4K\
A: M-J:[44=[3<2OP!M6\'>OL/F?L&;RA[

Q: A DRUNK DANCES WITH ME, SINGING LOUDLY
H: AGHI6/MGG$EJAA=0GE9Y&ICN96FK"ME4'
A: =KQ%Q/MG;4AE9Y1D4<O8MV

Q: I'VE GOT INTO THE INDEX ROOM. WHAT NOW?
H: K3H8H5CMN44=[-8<M;E9Y/7ZB21G9K1S4A:_]0
A: M4AE=U!AMF?L44=["M@<U96FK.7@?+

Q: I CAN'T GET BACK INTO THE CUBIX AFTER LEAVING
H: =K?Y-L"C[3<Q"?BHL*Q2\,C@<>E9(
A: M>C0)296FK-H>AL'HQ/?!

Q: I GET HIT ON THE BACK OF THE HEAD BY FLYING DEBRIS
H: B=Z/?>MG)KL(AKL3<>8J?7[%GG2)@@A
A: ?CE6\45DS4>3QC3T*#(X&Z'L!RM)KL"JCH<\

Q: A SERGEANT DOESN'T LIKE MY OUTLANDISH CLOTHING
H: A=[$K6N;Y-L$EJ4N4J2[(AJM3B>=9:FF?10
A: P.<QN44=[(9SLF:#IC2JU&L=>S44=[)E@!

Q: I WANDERED INTO THE PARADE SQUARE AND GOT REARRESTED
H: M49SS,M44=[,5RAL44AE9Y96FK35GF78\$K
A: @>OL719SL96FK.7@?\M344=IR4;Q44=[3AEV

Q: A STRAY SHOT HAS HIT ME, WITH LETHAL RESULTS
H: B=Z!SL&CIAAL96FK$K?Y-L3B.@B@?*@@A
A: I5MA6JAZ244=M3[)JM!_3.E?[2=F?1*

Q: THE FRENCH TAKE EVERYTHING AWAY FROM ME
H: GAEL44=[%I6\/7Z44=[78C:8\/CN44=[':L8*
A: R6FK#>MR'>OL44=HS"?BHU,5S1M]

Q: I STUMBLED OVER A SOLDIER AND GOT MY THROAT CUT
H: L<F96OM,=B:[!_$=M9>M=F>M!BQ5M3KEV
A: =K?Y-L'HQ71=M3[44=[&L3I5EX"GM9F,B,

Q: I AM TRYING TO FIND A HILL
H: R6FK#>MY-L32@[)KL44J=F2AX44=[4>3@N\
A: <I=D5^!_4>3@[4;Q32@[71=M3[)KL)J\

Q: I SEEM TO HAVE RISEN TO THE RANK OF GENERAL
H: M5D8[)JM/7Z44=[%N@2I5B*
A: R6FK-H>AL%N0>O5[&;RAZ22C9R!SL44=[%I6+

Q: WHAT DO I DO IN THE BAKERY?
H: @HEL!MKG&FCC7EE,!5>2[96F=N,C2E)
A: ;SDG!_,C2EZM3&ICN)E8IC;4S5F?!

Q: THE CHASSEUR CALLS MY BLUFF
H: D:@KP"JI1@CE9YM3(=",M%<R6CMG&I@=9?+
A: L6>GR44=[$K4R88IF?Y444=IR3.KI?1*

Q: WHAT DO I DO WITH THIS LOOSE BRICK?
H: :_0?D@69J9[7*XG/F?L/7Z44AJM(G=9:0
A: IE7@T)KL!M6\-4J:[!_(G=9*

Q: WHAT USE IS THE SEWING ROOM?
H: @H@5\1D0NA5F? 2'E5C\96FK!R8:?+
A: :AQ<=I?1GMG.AQ5>2[!SL!K@#

Q: THE SOLDIERS IN THE INN DENOUNCE ME AS A THIEF
H: M4A<Q/NM!Q3[&;RALM3!M6\36C9IF[
A: @>OL(9SX4'>OL#IC2J!4'>OL/F?[

Q: WHY CAN'T I GET THE SNOW TO THE FIRE?
H: BKL-8GH?M"CAIC3[96FK'>OL)KL44=M3*
A: P;=?9Y4>/BH#244=[3;AHI)JM.AQ5>2*

Q: WHY CAN'T I BUY A CANDLE?
H: M49SL#>M6H9NA5:HU-4J:MN)JM#O/Y?V
A: ?IC5>OL44=[#>M6H95&'>OL(AJM30FJ@<CA\

Q: THE CANDLESTICK MAKER DENOUNCES ME TO THE FRENCH
H: A=",M#O/Y?!&(M8BF=N(AD"
A: H7@?MN(ADS!_&FCC7E!

Q: I DISTURBED A GROUP OF GRUMPY GRENADIERS
H: M4=TG!Q3[4>G0E9Y4;Q399@KQN
A: @HQ44J=F2AX44=DIN41IFL1D4<O8MV

Q: I GET ARRESTED BY THE OFFICERS AT THE CROSSROADS
H: O9E1[72K4X96F=N&?@OLM3!M6\&;RA[
A: KC9R1D4:HAMS4"S?L$K?Y-L'>OL#LC<7M3?+

Q: THE CAVALRY CAUGHT ME NORTH OF THE CORNFIELD
H: :Q3IY-L44=TG2/S4=MN&;QN.ACB470
A: KC9R.ACB4&244=TG72C@T4A=<R"?BH$

Q: THE FRENCH UNMASK ME AT GOSSELIES
H: R6FK,9OL449SL"CG;B8MR'HQ72K4GF?L96F*0
A: N>2[44=["CG;B8MY,M#>Q@78F>[4;Q(A;A*

Q: A CANNON BALL BOWLED ME OVER
H: M>GG4;Q,C@<U#R?1*
A: CK8CP/G/MN)K[

Q: I CAN'T ESCAPE FROM THE PIGSTY
H: N;\4$KH7^4/CN36;AR*X:\
A: IE7@T44=["S9=!43A-M6\/?R)KX4/CN$E>(

Q: I'VE BEEN DISRUPTED BEFORE I TAKING A FINAL BREATH
H: L.AME-F>[(AJM"GF^ 8>>G9M;:>KT4A-CN\
A: @HEL3<>8[3;G1@Z4;Q44J=H(0

Q: I DISTURBED THE EMPEROR'S SNOOZE
H: R6FK35GF78\(9U/[,9<Q<7?\"WG.AHJN
A: =KQ!K@T3<7N8MG/CN1D4<O8MV

Q: A BELGIAN GENTLEMAN HAS FOUND ME IN HIS CARRIAGE
H: N>2[96F=N)D4FBE3S5F?R!_,=K@89[-BC3*
A: R6FK(9U/[4;Q(A;A[596AMN44=[#>Q@78F>*

Q: I GOT SPLATTERED OVER THE WALLS IN THE VILLA
H: FBC3[(9RA1'4,9N@M3B=D3M+K#
A: R6FK5>2?\44=[$AQ3:B[4;@Q3<@?!

Q: I DON'T UNDERSTAND THE RED & ORANGE BUTTONS
H: IB3N@M/? 244=TG#>MR"C[&C>N=3?\/F?[
A: HC/M9>[4;8@E9NM/?_"7@(223?\&CI3N\

Q: I GET ARRESTED FOR BUTCHERING THE BUTCHER
H: ;CNAL!U9:;\44=[!O@5<Q/M5B[/7Z'N4CH[
A: =K?Y-L4-J:[44=[#I9<U/M\24>GG!_"?X6?7O[

Q: I CAN'T TAKE THE EMPEROR'S MAP
H: P19SL-4J:NM96FK44AE=U96FK.7@?\)K+0
A: M>C0)2*K>AL4-J:[44=[*K2Y/7Z72E7*

Q: THE CAVALRY CUT ME DOWN BY THE CORNFIELD
H: R6FK4;@<U!_7;=?9Y4A=<;E9Y"?BHU44=M3*
A: @HQ7.NAX4._"^'L01RAL44=[359Q>C5G@E1M]

Q: PRUSSIAN DESERTERS STEAL EVERYTHING FROM ME
H: P.G@T44=TG(9U/[4;Q3A1<KT3<>8O4AE9ZN
A: E9OL44=HS3A1<KT3<>8O4AE9Y5>2G9N@\

Q: THESE MUSKET BALLS ARE NOT GOOD FOR MY HEALTH
H: @>OL/F?L/7Z44=[7*XV
A: M4=[/?>MG7*XG)JMB"KH7TM
```

Continued ▶

◀ **Warlord hints continued**

Q: ENGLISH DESERTERS BEAT ME TO DEATH
H: R6FK(9U/[4;Q4-J:[44=[27>ALL2=F?1*
A: BER44=[&ICA2NAX4-4J:[&ICN44=[(AC@#

Q: I GOT CUT IN TWO BY THE WARLORD'S HENCHMAN
H: R6FK(9U/[4;Q45D8[96F=N3.AME-F>*
A: E9<U/[!_&O>2[,=KL)ER44=[0?H-AMN3A;C3*

Q: A SHARPSHOOTER GOT ME
H: M1G@T(ADS96FR+3[/?R44=[3.L8[36;A*
A: A=",M&L7<I6HMG23<K@MU27*U/[4;Q(AD"

Q: AN ARMY OF ANGRY INFANTRYMEN ACCUSE ME OF ARSON
H: M>GG%Q/MGG2=F?1[/F?L/7Z44=M3*
A: @HQ%<RAL)EF;Q44=[,5S>7E7N\

Q: THE WHISTLE DOESN'T WORK
H: BKS,M/?>MG(9K:Z!_71AJA89*
A: BEE2MBL!_05<_)EF;Q)K[

Q: I DISTURBED THE EMPEROR'S BODYGUARD
H: GAQ#L>@8IF[
A: =KQ!K@T1D4<O8MV

Q: I'M STANDING ON THE BUNK. WHAT NOW?
H: R6FK-H>AL32OL96F=N36>AL?M%Q/IR(A>A=M]
A: IE7@T44=[2=@7Z45C9NM4;Q-4J:[!_(G=9*

Q: I GET DENOUNCED BY A FARMBOY.
H: L<F96OM,=B:[4;@Q-H.EX/7Z!_'H@5\44AE9(
A: R6FK-H>AL'>OL/F?L/7Z44=[#>QBL%<Q:=<M]

Q: I NEED TO REUSE THE LANCE, BUT THERE'S NO CHARGE
H: L<>8=M5UG3A>/M9>[#>MR23>E9Q5>[)K[
A: @HQ44J=F2AX44=[&IC3NALM3!M6\'NON@\

Q: I STOOD IN THE WAY OF A FRIGHTENED STALLION
H: G7S<L45D8'4$K?Y-[
A: @HQ%<RAL4;Q!U9:;\)K[

Q: I GET BLASTED BY A MARSHAL WITH A BEARD
H: ;S?L)JM44=["C<Q2\23<K30
A: IE7@T44=["C<Q2\!V*XV

Q: I GOT A BULLET NEATLY THROUGH MY FOREHEAD
H: M4=M3[)JM-BC3[449MR/?7[%I6\4;Q!_'N9!
A: AAKL44=[6/O1M/MR72K4X44=[09JA;=#

Q: THE CART DISAPPEARS
H: R6FR%@T(9U/[4;Q-BG/[&;RAL44=I!
A: BKS,M'H:E9Y.ACB4&296FK(9U/[/?7[4A=<!

Q: I GET TRANSPORTED TO AUSTRALIA
H: LA-M6=Q2\4>3<S98IFL&ICN44A<Q/N\
A: =K?Y-L3A1<KT44=[-4O_

Q: I DON'T HAVE TIME TO GET EVERYTHING THE FRENCH TOOK
H: M-J:[!_35GCBL#R?L4;Q!K@T96FK7*MF[
A: [2-J:[!K@V>-<>ALL(=GD_

Q: WHERE CAN I GET A PEA?
H: K3H8H5CMN1D,MF-HE;8MR3<F;/0
A: BER6+Q/M9:QU,M+>K/E=IE\

Q: THE SENTRY REFUSES ME ENTRY TO THE GRAND HOUSE
H: A=[-<>ALL,9OL44=[0?DA94MR)E!
A: R6FK.7@?\3<>8[$AN=1S/E=NM4;Q35GHI(AD"

Q: A HUNDRED HUGE HORSE GUARDS HAVE HUNG ME
H: A9M9Y!Q=F96\!_"GKL,C?9>MN44=I!
A: H?7[4A=<R)ER44=[,5S>7E7NY444=IR.ACB4'

A: I DON'T UNDERSTAND WHAT THE DUKE MEANS
H: M4AJM)JM!_(AEF[
A: -A+4A=<EM4;Q&I:CT44=[7*Q:CC2#,M0<CE[

Q: I CAN PRODUCE A PIERCING NOTE
H: M4=M3[)JM!_45D8[!M6\!_0<5BB)@@A
A: N>2[44=[71AJA89[,5S1M]

Q: THE BRITISH ARMY DON'T WANT MY ASSISTANCE
H: P.G@T$K?Y-L/7@?MN44=HS!MKG44=I!
A: @HQ.ACB4X/CN3<F?4X&L=>S7*S1M:C@

Q: I CAN GET BOTH THE MODULE AND THE LANCE TO BRUSSELS
H: L<>8J?7[%GG2[#LF78\4-J:[44=[,5M5B*
A: =N=AP)KL)ER44=[&;Q;5MJN,M#>QB[

Q: I CAN'T FIND ANYTHING USEFUL IN THE DUKE'S STUDY
H: BKS,M"COC.@IR44=[/3H;>Q?M-8IF5F?7?+
A: E==NL44=[-4O^2)KS,M596AM<7<S4'

Q: I KEEP GUESSING WRONG ON THE HILL
H: A=[(9RM"C@IR)ER44=[&L3I5EX#>LC_
A: =E;\96FK23<C\44=['K/E@CK560

Q: I CAN'T GET ALL THE THINGS I WANT THROUGH THE FOREST
H: L<>8J?7[%GG2[)JM'H:E9Y4;Q"PC>@2GG\
A: F4J:[5>2[/7Z44=[&;Q;5MJN,M#>QB[

Q: THE PRUSSIAN DESERTERS ACCIDENTALLY SHOOT ME
H: M4=M3[-H>AL"C[3<>8[!KH1M<3S5M/*
A: M4=M3[!Q3[4C8Q7*X:M/7Z!U9:;EE9Y44=H"

Q: THE WARLORD'S MINIONS FIND ME VERY QUICKLY
H: M>/U/GT,=>AL[
A: M4=TG#>MR32@[44=[,5LC_

Q: I CAN SHOOT ONE MINION BUT THE OTHER GETS ME
H: +.)JMR.R.-4MKV
A: H?7[!SL!_45D8[)JM0?D@69J9*

Q: SOME HINTS ABOUT THE ENDGAME IN THE GRAND HOUSE
H: =KH7R72K4X44=[7*Q:CC2\96FK-H>AL"C*
A: L<>8R1=M3["CCAE6\44=[4-O5NA>GV

Q: MORE ENDGAME HINTS
H: @BM/[44=[,5M5B[M3!_71AJA89[&ICN96FZ
A: B>GAC3[44=['K3@I^4-<J99<C\44=["JI0*

Q: MORE ENDGAME HINTS
H: E9<C\44=HS!_$=M5B'4!_&C>N=3[/7ZX7
A: ><RAL!SL44=[32R.MZ444=IR&;K@TF:7*HK[

Q: MORE ENDGAME HINTS
H: R6FK#>M@AEL3.U/'496FK#>M@AEL3A;C3*
A: ?ICNTA+4A=<EM!M6\05M69OCM/?7[-BC3*

Q: TIM TREVYL NEEDS TO CUT SOME WIRES
H: M>7D@<E9Y72:HHM)JM36D<C5Q]
A: M4=[#>M6HGA5:HU-4J:MN(9C\30FJ@<CA\

Q: WE HAVE A PROBLEM WITH A THICKER STRIP
H: EC@<U)ER96F=N&CC=E9Y#>AGE7O[
A: N96AMN44=[-4OP)ER44=[3AA/UV

Q: SOME METAL ISSTUCK IN THE COGS
H: ;COC.@IR44=[41@O470
A: F4J:[45DS4>3QC3[,M"C?\&ICN(AD"

Q: I NEED SOME TWEEZERS
H: N>2[44=[7*Q:CC2#,M01HI]
A: ?CE6\44=HS)ER44=[&L3I5EX#>LC_

Q: I NEED SOME GLUE
H: @EI0[]#'N8"
A: ?L=>S!_'N8 VE=R2E9Y3<=8E<M]

Q: WHAT IS BEST FOR SPLITTING A DIAPHRAGM?
H: BK?M,=B:[,C@<>E9Y&ICN!-@@2)ER!-@@A
A: P1=M3[$E;\96FK&CE6\44=[&CIAAL36CJ/M-0

Q: WE NEED TO SHORT SOME CONTACTS
H: A9U/IY-L96FK$K?7[449SL"CAIC3:0
A: R6FK%N0>O5?\&L=>S6+Q/M9:QU,M$Q99>J?10

Q: NO GOOD WITHOUT SOME OIL
H: I1KAS4>3@NM!M6\3.M6*@@A
A: BER44=[#R-GOH"?S1J=@>"

Q: I THINK TIM TREVYL IS TOO CLUMSY
H: :_&?<S4=M[_=>ALL4;F.EX)JM"CO@1M]
A: ?L=>S44=[27U3E7[/?R1D,MF-HE!

Q: I NEED SOME NEUTRINOS
H: M4=TG4>7>@>MN44=["M>5-
A: K3?\"S?@;?R&L=>S&L3I5EX#>LC^223<CU&0

Q: I MISSED THE JUICY BITS
H: A9U/[96FK#E9Q5>[,9ANL)ER44=[,5M5B:0
A: L5G@EMN

Q: I CAN'T GET 100% SCORE
H: R6F=N-4OG8C9U)JM2C>AEV
A: R6FK#>MR)=Z96FK3AA/UV

PINEAPPLE SOFTWARE

Programs for the BBC model B, B+, Master and Master Compact with disc drive

DIAGRAM II now also available for ARCHIMEDES

Diagram II represents a major breakthrough in the techniques used for drawing software on the BBC micro. It works on a completely different principle to other drawing software by storing the drawing information straight to disc as coded 8*8 pixel blocks.

This technique has three major advantages. First, the size of the diagram is only limited by the amount of space on disc. Second, there is no limit to the amount of information which can be stored on a given diagram as the information is stored on disc and not in computer memory. Third, the disc storage technique allows the smooth scrolling of the screen over the whole surface of the diagram.

For people not familiar with Diagram, the basic operation of the program is to first display any part of the diagram, either by quoting an index name or screen number. At this point you are free to scroll the diagram around the screen using either cursor keys, trackerball or mouse. You may stop scrolling at any point and enter the edit mode which allows you to modify or add new information to the diagram. When you have finished making alterations, the new information is stored to disc and you are free to scroll elsewhere on the diagram stopping to edit at any time.

The edit features are now very comprehensive. Text may be typed straight from the keyboard, and if other fonts are stored as user defined characters then these fonts may be printed using the normal keyboard keys.

The print routines are now completely 'scaleable' with both the horizontal and vertical scales being totally variable in 1% steps between a size that will give 18 mode 0 screens on an A4 sheet and a size that would print just one pixel on a sheet! The routines are adaptable to most types of dot matrix printer and full advantage may be made of wide carriage printers. The printouts may be rotated through 90 deg. if required.

The new editing features make DIAGRAM II suitable for all types of serious drawing application including scale drawings, flow charts, architectural, family trees, and many other subjects as well as circuit and schematic diagrams. As an example of what Diagram II can do, this complete advertisement (with the exception of the PCB drawing) has been produced with the package.

1. Works on any model BBC computer with either DFS or ADFS. (ADFS only if Shadow memory available).
2. Will automatically take advantage of shadow memory (any make) to provide more User Definable Characters, 880 with Shadow, 381 without Shadow.
3. Rapid horizontal and vertical line drawing routine with automatic joins for circuit diagrams.
4. Full rubber band line drawing and circle drawing modes.
5. Takes advantage of the Acorn GXR rom to provide drawing of arcs, sectors, chords, parallelograms, ellipses, and flood filling. Note this rom is already fitted to Master and Compact machines.
6. Pixel cursor drawing and deleting mode allows very fine detail to be added.
7. Defined areas of screen may be moved, copied, deleted or saved to disc.
8. On-screen indication of cursor position shows either the cursor position on the overall diagram or the distance from a preset point.
9. Keyboard keys may be predefined to print User Defined Characters, enabling new character sets to be stored as user defined characters and then printed straight to the screen using the keyboard keys.
10. Wordprocessor files may be loaded to the screen and automatically formatted into any shape screen area.
11. Index names may be set up to point to given areas of a large diagram, to enable rapid access to a given point on a diagram.
12. Fully compatible with Marconi trackerball and most makes of mouse.
13. All Diagram 'Utilities' are included, enabling screen ident numbers and borders to be added, and any area of diagram to be moved or copied. The whole diagram may be displayed in reduced scale (either 4*4 or 8*8 format) on a single screen, and the size of the overall diagram may be increased or decreased.
14. Completely scaleable print routines allow any area of the diagram to be printed either horizontally or through 90 deg. in scales that may be varied in 1% steps allowing up to 18 mode 0 screens to be printed on an A4 sheet (still with readable text).
15. Complete with 40 page easy to understand handbook.

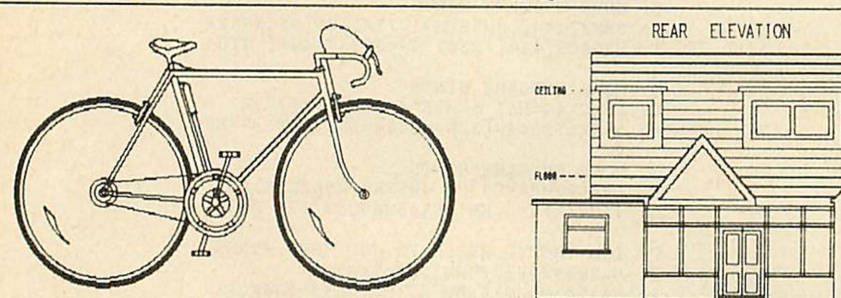


Diagram II consists of a set of disc files and a 16k Eprom. The disc supplied is formatted in 40T on side 0 and 80T on side 2. Please state if this is unsuitable for your system, or if you require a 3.5" Master Compact disc.
ARCHIMEDES version on 800k 3.5" disc.

DIAGRAM II — £55.00 + vat

P & P free (except overseas)

N.B. Upgrades are available to existing Diagram owners. Please contact Pineapple if you have not received an upgrade letter.

PCB

Pineapple's now famous printed circuit board drafting aid produces complex double sided PCB's very rapidly using any model BBC micro and any FX compatible dot-matrix printer.

The program is supplied on Eprom and up to 500 component and 500 ASCII component descriptions may be stored for each PCB. There is no limit to the number of tracks that may be stored for a given PCB although the maximum board size is restricted to 8" * 5.6".

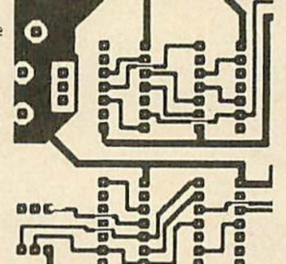
Using a mode 1 screen, tracks on the top side of the board are shown in red, while those on the underside are blue. Each side of the board may be shown individually or superimposed. A component placement screen allows component outlines to be drawn for silk screen purposes and component numbers and outlines entered on this screen may be displayed during track routing to aid identification of roundels.

The print routines allow separate printouts of each side of the PCB in a very accurate expanded definition 1:1 or 2:1 scale enabling direct contact printing to be used on resist covered copper clad board. The print routines are very fast taking typically 5 minutes for a 1:1 print of a 7" * 5" board.

This program has too many superb features to describe adequately here, so please write or 'phone for more information and sample printouts.

PRICE £85.00 + VAT

Plotter Driver to suit most plotters £ 35.00 + vat



PCB AUTO-ROUTING

This brand new addition to the PCB program greatly increases the power of the software and speeds the design of PCB's even more.

A connection list of up to 190 connections may be entered in the form of a 'rats nest' and then the computer does the rest!

You may specify which side of a board you wish the track to be on or leave the choice to the computer, and you may also say whether tracks should be allowed to pass between I.C. pins. Tracks may still be drawn manually at any time so boards may be produced by a combination of manual and auto techniques if required.

The program is in the form of a second Eprom and all the features are available even with an unexpanded model 'B' computer.

Please write or 'phone for full details.

COMPLETE AUTOROUTE PACKAGE (including manual eprom) £185.00 + VAT

MARCONI TRACKERBALL

This high quality device comes in three versions. Version one is for the standard BBC micro and comes with the Icon Artmaster drawing package from Micro-Draw, and Trackerball Utilities which allow the trackerball to be used with other software.

Version two is for the Master 128 computer and this comes with the Pointer Rom. This is a Rom which allows the Master to be configured for use with the Trackerball and has commands to enable the Trackerball to intercept the cursor key or joystick routines of other software. Commands are also available to reverse the axes of the trackerball and set the sensitivity. The three buttons may also be set up to produce any ASCII code.

Version three is simply the bare Trackerball which comes without software but is suitable for use with specially written software such as Diagram or Diagram II.

Trackerball adapters are also available which plug onto the end of the cable and convert the connections of the trackerball to be the same as a mouse. This enables the trackerball to drive all types of 'mouse' software.

For Model 'B' and B+ (with Icon Artmaster)	£ 60.00 + vat
For Master 128 (with Pointer Rom)	£ 60.00 + vat
Bare Trackerball (no software)	£ 49.00 + vat
Pointer Rom - available separately	£ 12.50 + vat
Trackerball to mouse adapters	£ 8.00 + vat
Tracker/Archimedes	£ 16.00 + vat
Postage & packing on Trackerballs	£ 1.75

MITEYSPICE

Miteyspice is a very powerful AC & DC circuit analysis package with graphics suitable for use with any model BBC micro including those with 2nd processors.

As well as all the usual facilities available with this type of program, non-linear effects, small signal, noise measurements and sweeps may be performed. Component values may be swept, allowing component tolerances to be investigated as well as thermal performance etc. Comprehensive transistor modelling is incorporated using a 20 parameter Ebers Moll description. The program is supplied on disc with a very comprehensive 49 page manual.

PRICE £119.00 + vat

ADFS Utilities Rom — ADU

ADU is an invaluable utility for all ADFS users. It adds over 22 new *commands to the ADFS filing system as well as providing an extensive Menu facility with over 35 sub commands covering areas such as repeated disc compaction, saving and loading Rom images, auto booting of files and many more.

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DO IT THE HARD WAY

A backplane, extra RAM and a hard disc are popular with Archimedes upgraders. We take a look at how you go about fitting them

David Watkins

The basic Archimedes 305 or 310 machines are already a target for upgraders. In particular, the 305 can be upgraded to 310 specification simply by plugging in 16 RAM chips to provide the missing 0.5Mb, and the 310 can be made significantly more powerful with the addition of a hard disc.

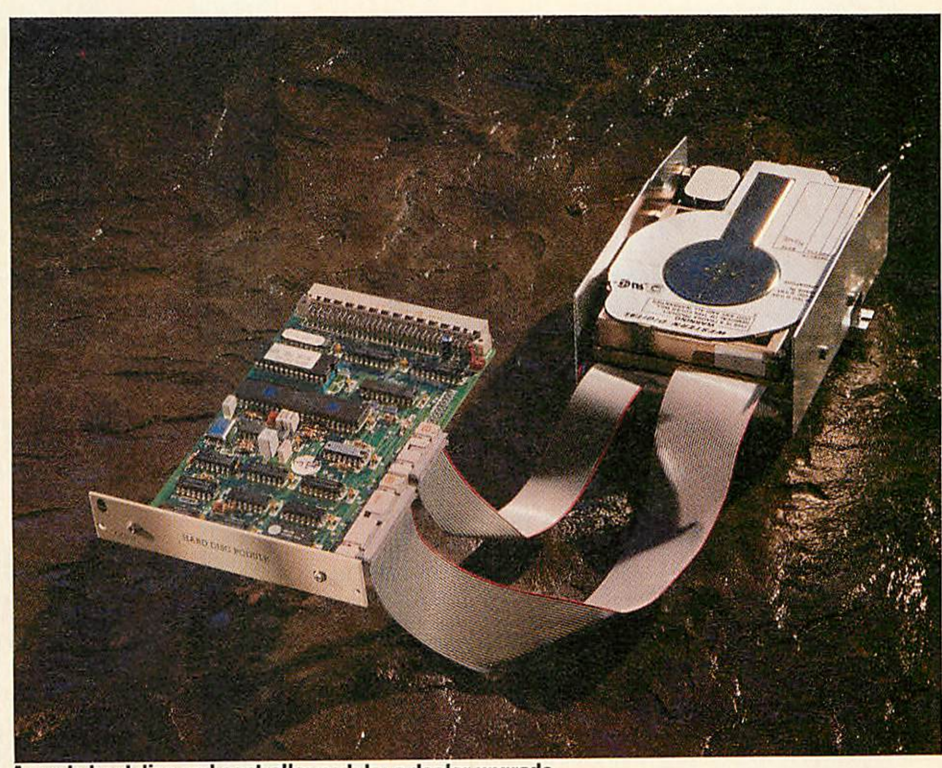
Adding a 20Mb hard disc upgrade to your Arc gives it increased speed and storage capacity. The increased speed comes from the faster disc access time – for example an 80k *Artisan* picture takes 19.03 seconds to *SCREENLOAD from an 800k (double format) floppy disc, but only 5.80 seconds from a 20Mb hard disc.

The greater storage capacity means that you can use larger files. File size is limited by disc capacity, and the standard 20Mb hard disc is over 24 times larger than the floppy disc. As an example, a file of digitised sound filling a floppy would give about 42 seconds' worth of sound, while a file filling a hard disc would give about 18 minutes' worth. A more realistic use for the hard disc would be to store database files of over 800k.

Unlike the Archimedes 400 series, neither the A305 nor the A310 comes with a backplane fitted. The backplane is the adaptor which is needed to allow podules (peripheral modules or expansion cards) to be added to the Arc. When the backplane is installed in a 300 series machines, a fan can also be added to make sure that the temperature inside the casing is kept at a reasonable level. (This isn't usually a problem, but the fan eliminates any doubt.)

To fit the hard disc to a 300 series, you also need to fit a hard disc expansion card, which plugs into one of the two available slots in the backplane. This leaves only one slot for further expansion. It is theoretically possible to fit a four-slot backplane to a 300 series machine, like the one fitted as standard to the 400 series – but this won't be possible until some company releases a four-slot unit.

The 400 series machines both come fitted with a four-slot backplane, but they also have the hard disc interface on the main circuit board, which eliminates the need for the hard disc expansion card. All the 400 series machines currently available are 440s which already have a hard disc, but the forthcoming 410 models, due to be released in the near future, will have only the interface as standard. In fact the 400 backplane is slightly different, in that it has some extra connections for addition of a floating point co-processor to speed up mathematical calculations by a factor of 10.



Acorn's hard disc and controller podule: a dealer upgrade

PHOTOGRAPHER: NICK DICKS

The fitting of a hard disc is usually an authorised Acorn dealer job, and although it is possible to fit the disc yourself, you should ask your dealer to fit it. There isn't any extra charge – it's included in the price of the hard disc unit. You can ask your dealer to fit the backplane and fan unit at the same time. However, the fitting of a backplane and fan unit is not difficult, and could be readily undertaken by most users.

The hard disc upgrade

The dealer will return your Archimedes with the hard disc configured as drive :4, formatted and ready to use. You should find your machine configured with 'HardDisc 1' and 'Drive 4' – confirm this with the *STATUS command. There will be a Basic program in the library directory on the disc called HFORM, which should be copied to a floppy and stored safely away. HFORM is the hard disc formatter, and you may need it later, if for any reason you decide to reformat your hard disc.

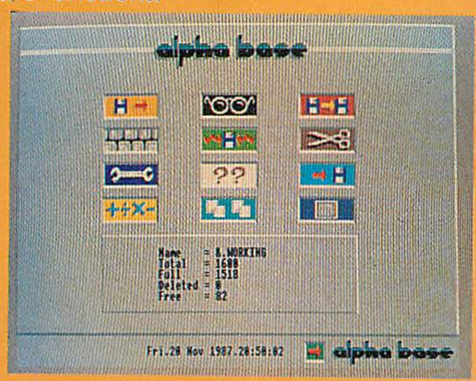
The dealer upgrade consists of fitting the hard disc, assembling the hard disc podule and fitting it, connecting and testing the components, then formatting and 'soak testing' the hard disc itself. There are several makes of 20Mb hard discs available, including Rodime, NEC, Tandon, Miniscribe and Olivetti. The current one supplied by Acorn is the Tandon, but this may change.



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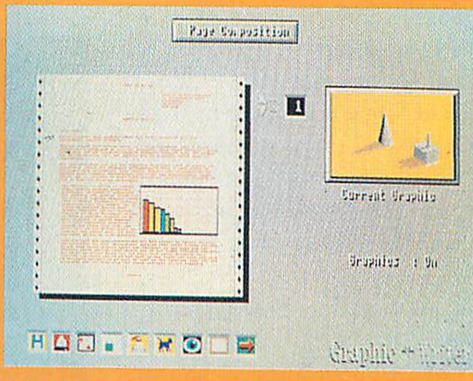
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The hard disc unit is mounted alongside the original floppy disc drive, making the hard disc and a second floppy drive mutually exclusive. If you want a second floppy drive then it will have to be an external one, using the external interfaces from Beebug, CJE Micros or Watford, for example.

Fitting the hard disc unit involves disassembling the plastic front moulding of the Archimedes so that a second power light can be inserted below the existing one. A new label is provided for the front of your machine with the legend 'Hard disc' below the new light. The hard disc is powered by the cable from the power supply, and the light is powered from the podule.

The hard disc podule plugs into one of the connectors in the backplane, and is held securely at the rear of the machines in place of one of the blanking panels. It is connected to the hard disc itself by two ribbon cables. Once it's in place, all that remains is to tidy up all the cables and tie them securely so that none of the connectors can touch any of the metal case.

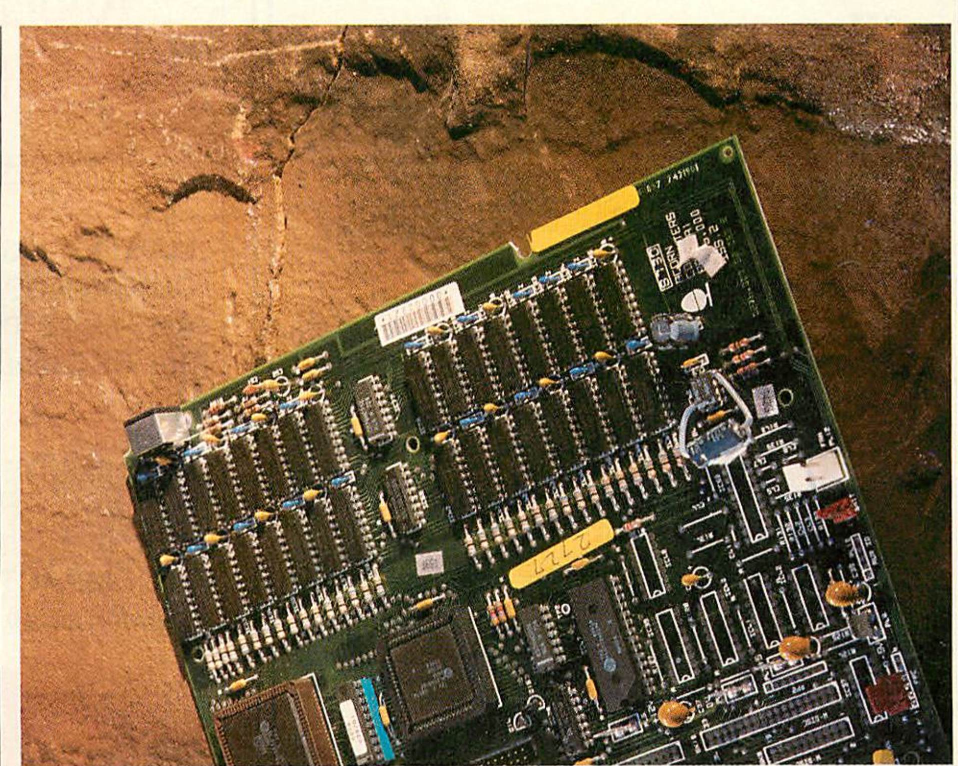
As soon as it's installed, you or your dealer should format the hard disc and note any defects. It isn't unusual for a few defects to exist on a hard disc, and in fact the manufacturer supplies a 'standard' known defect list with every drive sold. If however, any additional defects are detected, you should be informed of them by the dealer. You will need this information if, for some reason, the defect list on your hard disc becomes corrupted, which is unlikely, and you have to rebuild the list again after reformatting.

You can reformat the hard disc at any time to check the defect list, but as with floppies, reformatting the disc destroys all data stored on it. It is essential that any data you wish to keep, including the hard disc formatter HFORM itself, has been copied onto a backup floppy before reformatting.

The hard disc interface soak test program is not normally supplied to end users. It is used by dealers to check that the hard disc has been installed properly and that no further defects exist. It is run non-stop for 12 hours and performs a series of Format, Verify, Write and Read operations on the disc, and then reports on defects, indicating the number of Write errors and re-reads that are required.

Performance

The Basic program (listing 1), based on the *PCW* Store benchmark, was used to time the writing of a 20-character string to a file 1000 times. The table shown above compares the results of running this program on the 20Mb hard disc, on an 800k floppy, and on a 640k floppy. The table also contains the timings for saving and loading a 20k file, as well as the timings for the *SCREENLOAD and *SCREENSAVE of an 80k *Artisan* picture.



Upgrade 305 to 310 by plugging in the lower row of RAM chips

BENCHMARK TIMES (secs)

	20Mb hard disc	800k floppy	640k floppy
*PCW*Store benchmark	3.25	6.12	18.88
*SAVE 20k	0.41	1.82	1.91
*LOAD 20k	0.22	1.28	1.71
*SCREENLOAD 80k	5.80	19.03	41.35
*SCREENSAVE 80k	10.54	26.03	87.53

One of the reasons that the hard disc is faster is that it is spinning constantly while the Archimedes is on. Floppy discs are normally stationary, and there is a delay while they switch on and speed up. The constantly running hard disc obviously causes some noise, like the fan, but the drive is one of the quietest I have heard, and it is not at all distracting. I fitted the backplane and fan unit some time before I installed the 20Mb hard disc upgrade, and I noticed no difference between the whisper of the fan alone and the fan plus hard disc.

The storage space available on the hard disc demands a much more structured use of directories and subdirectories than is often necessary with floppy discs. A floppy disc might only hold a single utility along with its associated data files, and never need to be accessed via the desktop. Only a few floppy discs, such as the Welcome disc, are easier to access with the desktop. The number of files you will eventually store on your hard disc will mean that some may get lost and even forgotten unless you plan a sensible directory structure. It is with such directory structures that the desktop comes into its own.

When your Archimedes is configured for a hard disc a new icon appears beside the floppy icon – a white rectangle bearing the legend 'Hard disc'. Selecting this icon opens a window on the root directory of the hard disc, as would be expected. The ability to open two windows, one for each disc, in chosen directories, makes the copying of files, or groups of files, between discs an easy and fast operation.

With the PC Emulator, it is possible to partition the hard disc so that 10Mb is available for Archimedes ADFS files, and the other 10Mb for MS-DOS files. The emulator package contains a utility which creates a file that appears to MS-DOS as drive C:. The default 10Mb partition gives a

Leonardo

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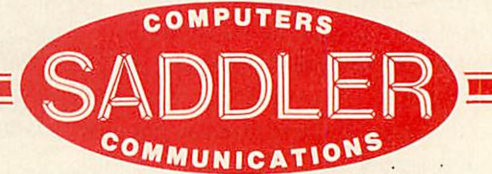
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total emulated size of 305 cylinders, with four heads and 17 sectors of 512 bytes per track. (305*4*17*512=1061880 bytes). The PC Emulator and the MS-DOS files may then be installed on the hard disc. The faster disc access times improve the performance of the emulator. For example the *PCW* Store benchmark in GW Basic ran in 28.95 seconds on the hard disc, compared with 38.72 seconds on a 720k IBM PC format floppy disc.

The hard disc is a pleasure to work with. I have all my regularly used utilities to hand, without having to fumble through the debris to find the right floppy. My current work files are immediately available, and I've got the odd game or two tucked away for when I need a break. It only takes a moment to save my work, quit to the desktop, and run *Black Queen*, fiddle with an *Artisan* screen, choose one of the desktop games, or zap a few aliens.

The only problem that I can see is the lack of an Archimedes hard disc archiving program. There is no problem in backing up files of less than 800k, as they will fit onto a floppy. The problem will come when a datafile exceeds 800k. Then I will need a utility to write one file across several floppies, in the same way that the Econet archive utility does. It won't be long before an enterprising progammer solves this.

RAM upgrade

The 0.5 RAM upgrade can easily be fitted to the Arc at home. To fit it, switch off, unplug and unscrew the case of your 305 – there are two screws on either side and three along the rear top edge. Slide off the case, and the circuit board can be seen. But the sockets for the chips are hidden under the platform that the disc drive sits on.

To get at the sockets, you can undo the screws that hold the circuit board in the case (there are two of them, plus two plastic clips), remove the lowest blanking plate from the back of the case, then gently slide the whole circuit board back by a couple of inches. The chips can then be inserted, carefully checking that none of the chips' legs get bent underneath as you push the chip into the socket. The notch on each chip must face the back of the machine.

Fitting the backplane

The backplane kit consists of a PCB (printed circuit board), a mounting bar, screws and spacers. The board is fixed to the mounting bar using the spacers to achieve the correct positioning. Buyers of early kits found the spacers were made of quite hard plastic, and the screw holes were rather small, and it was not easy to attach the PCB to the bar. Following comments from *Acorn User*, the spacers have now been improved, and it's fairly easy to fit.

The backplane unit plugs into a connector on the Archimedes PCB, and the mounting bar is attached to flanges inside the Arc's casing. Three wires from the power supply (black, red and yellow), are connected to the backplane, to provide 0v, +5v and +12v respectively. The remaining cable is needed to power the hard disc, and should be clipped out of the way.

The fan unit is attached to the front left side of the casing, by the batteries. Four long bolts attach the fan to the case. An arrow on the fan unit indicates the direction of airflow, and the fan is mounted with the airflow going into the Archimedes. If the arrow is missing, take a guess, and turn the fan round if it blows air out of the case. A replaceable foam filter is attached to the inside of the fan unit, and the fan's power supply connector is connected to the circuit board at PL12.

SPACED OUT

Producing evenly spaced text can be difficult – especially on dot-matrix printers. Microspacing could be your answer

Graham Bell

If you're a *View* user, you may have come across the term 'microspacing'. Microspacing is a facility controlled by the printer driver, that file which you load into the computer before printing out. A normal printer driver can allow you to use italic, bold or underlined text, and there's a different driver for each type of printer. But you are unlikely to be able to use microspacing, because it is only available with drivers for dot-matrix printers.

If you've gone further and written a *View* printer driver for yourself, then you may possibly have come across microspacing another way. The printer driver program you've produced must contain a small section of code to deal with microspacing.

But what is microspacing? It is a way of evening out the spaces in a line of text. It's often confused with 'proportional spacing', but it's not the same. With proportionally spaced text, such as the typesetting for this magazine, each of the letters is a different width: an 'I' takes up less space than a 'W', and the overall size of a word depends on what the word is. So 'fill' takes up less space than 'word', because although they contain the same number of characters, the former is composed of narrower letters. To work out the length of a line of text, you need to know the width of each of the characters on that particular line.

If you need even more sophistication, then you also need to know the order of the letters. Certain combinations such as 'fi', which are known as ligatures, take up less space than the two letters would individually occupy.

This exacting standard is really beyond the BBC micro, but microspacing is not. When *View* justifies a line (makes all lines

With the microspacing printer driver from
listing one, you can also use highlights:
number one for underlining and number two for
bold. It also allows you to print pound
signs with the £ key and use a pad character.
This means that if you use a ¦ instead of a
space between two words, they won't be split
across two lines by formatting.

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listing one, you can also use highlights:
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across two lines by formatting.

Figure 1. From top to bottom, normal unjustified text; text justified with soft spaces; microspaced text, with fractional spaces; proportional spacing – using the printer to justify each line

the same length), it inserts any necessary extra spaces between words. If the line is two characters narrower than the ruler, it will have two 'soft' spaces inserted in the word gaps. These soft spaces are different from the ordinary 'hard' spaces between words, because they can be removed by reformatting the text in an unjustified style.

The only problem with justifying text like this is that the gaps between words get very uneven. If there are five gaps and only two soft spaces to insert, then two of the gaps will be larger than the other three. This unpredictable spacing can make the text much harder to read. When printing out the document using microspacing, all the soft spaces in a line are added up, then split equally between all the inter-word gaps. So in the above example, all the gaps would have two-fifths of a soft space inserted.

Herein lies the problem. Daisywheel printers can usually print two-fifths of a space, by altering the width of each character slightly. But dot-matrix printers can't, because the width of each character is fixed. In Pica mode, each letter takes up exactly one-tenth of an inch. This is why each character in a printed document lines up exactly below another, just as it does on screen. Figure 1 shows the effects of microspacing – the top part shows text from a dot-matrix printer, with the letters on a regular grid, and unpredictable spacing between words. The lower section shows how a printer can print the letters more evenly spaced, with the gaps between words equalised. But microspacing isn't usually possible on a dot-matrix printer.

Listing 1 on the yellow pages shows that there is a way around this. It allows you to use microspacing even with a dot-matrix printer. The program, when it is run, saves a *View* printer driver called MICROSP, which can be used with almost any Epson-compatible printers.

With your text in *View*, you load the printer driver with the 'PRINTER' command, then type 'MICROSPACE 12'. This switches on the driver, and any further printing will use microspacing. One oddity of *View* is that microspacing cannot be switched off, even by reloading the driver. The 12 in the command refers to the number of characters per inch that is printed – but 12 means 10 characters per inch and 10 means 12 characters per inch. In fact, the 12 means each letter takes up 12/120ths of an inch.

With the MICROSP driver, you can also use highlights, number 1 to control underlining and number two to control bold, just as you would normally. It also allows you to print pound signs with the key, and uses ¦ as a 'pad character' or 'exact space'. This means that if you use ¦ instead of a space between two words, the two won't be split up over two lines by formatting. This might be used to prevent splitting phrases like 'BBC micro'.

The way the driver works is this. When *View* is printing a line, it sends the characters to the printer via the printer driver. It puts the character to be printed in the A register of the 6502 chip, then calls the printer driver with the instruction JSR &400. It is the printer driver's responsibility to print the character. *View* occasionally also decides to change the overall width of the characters, for example by setting the width to 14/120ths of an inch, by putting the new character width in the X register

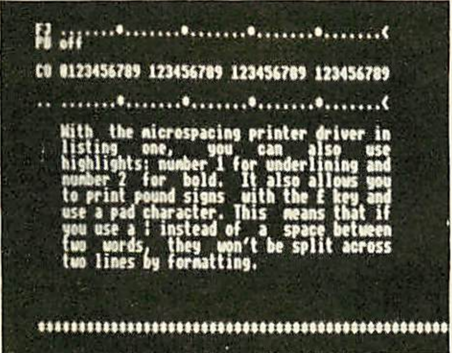


Figure 2. Justified text produced in *View*.

and calling the driver subroutine at &40C. The MICROSP driver first subtracts the normal character pitch from the new pitch, in this case leaving 2/120ths, then stores the extra pitch.

Every time it prints a character, it checks the extra pitch. If the extra pitch is zero, nothing abnormal happens, but if there is extra width to be added, then it outputs some data in the printer's graphics mode. This moves the printhead a little over to the right – just enough to make up the extra character width.

The rarely considered nine-pin dual-density graphics mode is used, and this way, the last pin of the printhead can be used to underline the extra width too. If it didn't do this, it would be likely to produce dashed underlining. This graphics mode also has the advantage that on most printers it gives 120 dots per inch, but sadly it isn't compatible with the majority of 24-pin printers.

All the control codes used by the driver for nine-pin graphics such as bold, underline and printing a pound sign are stored at the beginning of the driver, and so it should be easy to change the codes if they don't match those used by your printer. So the codes used by the driver should be compatible with the majority of nine-pin printers.

You can also customise the driver to work in Elite mode – 12 characters per inch. To do this, you need to change the pitch% variable to 10 (10/120ths of an inch), and when you switch on microspacing, remember to type MICROSPACE 10. Just as you can't switch microspacing off, you can't change the pitch midway either.

Proportional Spacing

If you have an Epson LQ800-compatible 24-pin printer, you can't use the microspacing driver, because these machines don't support the necessary nine-pin graphics mode. But there is another way you can make use of your printer, to give you fully justified proportionally spaced text. Sadly this won't work with the nine-pin machines, and nor will it with all 24-pin printers. Not all machines with an LQ800 mode accept the control codes necessary – although it does work on the Citizen HQP-40 and Epson LQ range.

Type in the yellow pages listing 2, save, and run it. It will save a printer driver called PROPSP. In *View* you have to justify the text as normal, so that both margins are aligned. Then load the printer driver and print the text in the usual way.

The driver works by letting the printer deal with the justification. It sets the printer in proportional spacing mode, so that narrow letters like 'i' will take up less space than wide ones like 'm'. Then it effectively counts the letters on each line, sets the printer's left and right margins appropriately, and tells it to justify the line of text between them.

This is done separately for each line; the text is stored temporarily at &900, an area of memory that should be free. Spaces at the left margin are counted and the left margin set with the ESC '1' control code. Then the total length of the line is worked out, adjusted slightly, and the right margin set with ESC 'Q'. ESC 'p' sets proportional spacing, and ESC 'a' 3 instructs the printer to justify the text. ESC '@' is used before each line because on most printers tried, it appears that it doesn't work without it. Figure 2 shows the result.

The adjustment results in the notional length of each line being reduced by one-eighth – to account for the fact that there are more narrow letters than wide ones. This factor was chosen by trial and error, and without it the text seems too spread out. You could try other adjustments by altering lines 1180 to 1300.

BARGING AROUND

Even the simplest of software can stimulate in the classroom, if it's integrated sensibly with other resources

Chris Drage & Nick Evans

In this column we have frequently presented case studies describing how computer packages have been successfully integrated into a science, humanities or adventure theme within the classroom – for example using the *Wagons West* software (February 1988 *Acorn User*). But you may be forgiven for thinking that only substantial software packages containing various resources, software and display materials are worth consideration. This is simply not so. Even the most humble programs can be used, providing they are well designed, educationally sound and motivating. Each teacher applies a number of criteria in order to evaluate any teaching and learning resource, and even the simplest computer software can be of value. With this in mind, this month we will describe how one teacher's class of nine-year-olds used a program called *Lock*, as they embarked on a study of canals.

Lock began life at Newman College in Birmingham back in 1982, from where it found its way onto one of the early MAPE tapes. It is a very basic simulation, showing how to put a narrow boat through a lock. It's written in Basic, the graphics are crude by today's standards and the 'user interface' could be much improved. However, it is simple to use, and most nine-year-olds can work through the program in less than a quarter of an hour. The program presents children with a choice of where they want their narrow boat to start. A number of simple commands control the simulation: (O)open, (C)close, (T)top, (B)bottom, (P)paddle, (G)gate, (M)move, (S)stop. By creating simple sentences like 'Open Top Paddle' (you press O, T, P), the water level can be adjusted, the lock gates opened, and the narrow boat moved in and out of the lock. If the sequence is correctly recreated by the children they are rewarded with the simple message 'your answer was excellent'. Not altogether the best motivator, but it is indication of what to aim for. No doubt an enterprising teacher or programmer, with time on their hands, could improve the program considerably. *Lock* transfers happily to disc from the original cassette, although your LEA computing centre will probably have the program on disc anyway.

Why did this teacher decide to use apparently outdated and unsophisticated software like *Lock* when the computer may have been better employed for other purposes? In order to answer this question we must look at the purpose to which the program was put.

During the summer term of a previous year the teacher took a class of children from his school on a short trip along the Grand Union Canal, through the Hanwell flight of locks in West London, on a converted barge run by Colne Valley Passenger Services. This was an end-of-year outing for that class, and during the trip groups of children assisted the barge crew in operating the paddles and lock gates. As a result of this, it became apparent that the day out presented a unique direct experience for any group wishing to study canals generally. A year later the teacher decided to use this valuable resource for just that purpose with a different class of children.

Naturally, a number of resources were assembled – library books, posters and slides in addition to the *Lock* program itself. These would provide images and

information for the various stages of development of the project. The 'canals' theme was selected from the childrens' own questions and interest in the subject, so introducing it was quite straightforward – they were inquisitive. It was decided that photos of the previous year's outing would be shown and discussed, and this way considerable enthusiasm for the topic was generated.

Slides taken during the teacher's own experience of a passage through the Panama Canal also stimulated much discussion, and the class was very interested to see the largest locks in the world. It was at this early point in the topic that *Lock* was introduced to help the children comprehend not only how a lock system works, but also to demonstrate the steps they would need to go through when it came to doing the real thing themselves.

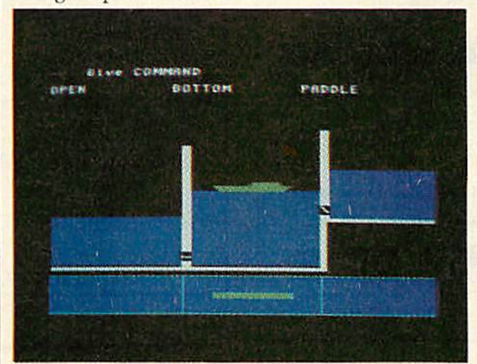
The program was deliberately introduced one week before the actual experience of being on the canal so it would still be clear in the childrens' minds.

Children attempted the computer simulation in pairs. This was practical even on just one classroom micro, as the program can be completed in a short time and the decisions required needed little discussion. It proved very successful, and any pairs who did not obtain an 'excellent' were very keen to get the sequence of operations correct. Those who 'got it right' the first time were not motivated to try a second time; not surprising for such a simplistic program.

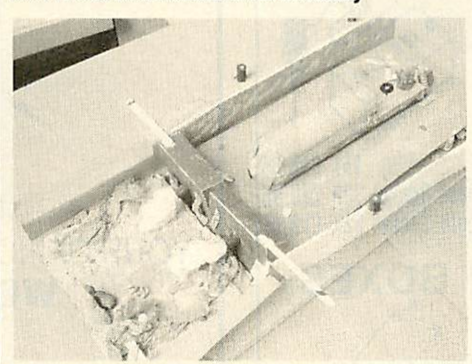
During that school year, the class had been writing to penpals at another school equally close to the Grand Union Canal. After a number of letter and taped-message exchanges, it was decided that the canal trip would be a pleasant culminating experience. So the two classes would join forces to put the barge through the eight locks of the Hanwell flight.

The day of the trip generated outright excitement. A truly delightful day ensued with the children paired off with their penpals in groups of 10, slowly taking the huge barge down the Grand Union, through the locks and onto a mooring place where a picnic lunch was held in an adjoining field. The trip back up the locks proved challenging, as the children had to work out the sequence of events at the locks themselves. The whole operation took place under close adult supervision, with both boys and girls performing the various tasks equally. On reflection, both children and teachers agreed that the day out was thoroughly worthwhile.

Back in the classroom the following week, the children embarked on model making. In small groups they set out to model an aspect of their unique experience. Most chose to model a lock with the barge at some point in its transit, while others decided on modelling the barge itself or details of the lock gates and paddles. Introducing science into the theme, a class lesson about water finding its own level under different circumstances was undertaken. This work stimulated two children to attempt to build a 'working' lock gate in a small aquarium, using masking tape, hardboard, Plasticine, coloured water and a small toy boat. This working model, complete with paddle, was so successful that the group later demonstrated it at a school assembly. The other, static, models faithfully reproduced the locks the children had experienced, right down to the detail of the pollution present at some points. Considerable skill was exercised during this part of the study as the children found that it was very difficult to model a lock system accurately. This problem-solving activity in groups provided a valuable opportunity for co-operative decision making and effort, and the resulting models were very pleasing indeed. They reflected the degree of perception and understanding the children had of their canal experience.



MAPE's *Lock* software is rudimentary



Pupil's model of lock and barge

The final part of this topic involved the children researching and presenting an aspect of canal life past or present. Projects on the history of canals in Britain resulted in children learning about the 'Navvies' (canals were called navigations, so the labourers who built them were navigators), and how hard life was for those families who lived and worked all their lives on narrow boats. Other subjects chosen included the contemporary recreational aspects of the canals, and 'canals around the world' was a popular topic.

During this part of the project the classroom computers were busy for most of the time, with children using a variety of software tools. *Pendown* and *Signwriter* from Logotron were used to produce headings and text for the children's written presentations. Newspapers with a canal theme were made using *Front Page Extra* (from MAPE), and one pair of children compiled a datafile of canals and their statistics using the *Key* database from GSN Software. This recorded such facts as the length of a canal, the number of locks it contained, its start and finish locations, and any special features – the purpose of this being to enable children to plan a canal holiday. Another group of students made up a play with a canal theme and to conclude the topic each group presented its work to the class as a whole.

In all this work the computer played a supportive role. At no time did it dominate the scene, but the children were aware that they could use the machine for a particular purpose related to their current needs. The *Lock* program made its brief appearance only to provide the children with a simulation of what was later to become a reality, and all the children agreed that it was a valuable experience. It helped them to sort out in their own minds how locks work.

There are many such programs which, on their own, should probably not come anywhere near the classroom computer, yet when integrated sensibly with other resources can provide a valuable experience for either one child or a whole class. So before writing off any item of software, stop! It may find a niche in your own particular arsenal of learning resources.

Lock *should be available from your local LEA Computing Centre or from Micros And Primary Education (MAPE), Newman College, Bartley Green, Birmingham B32 3NT.* Key *is available at a cost of £4.95 from GSN Educational Software, 50 Stamford Street, Ashton-under-Lyne, Lancashire OL6 6QH.* Pendown *(£41.98) and* Signwriter *(£18.40) are both available from Logotron, Dales Brewery, Gywdir Street, Cambridge CB1 2LJ.*

YELLOW PAGES

COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly T/D
Hints & Tips	41											
Listing 1		■	■	■	■	■					■	■
Listing 2		■	■	■	■	■	■	■	■	■	■	■
Listing 3				■	■			■	■	■	■	■
Arc Agora	48											
Listing 1-3							■		■	■	■	■
Bezier Curves	54											
Listings 1-2		■	■	■	■	■	■	■	■	■	■	■
Spaced Out (1)	76											
Listings 1-2		■	■	■	■	■	■	■	■	■	■	■
Go with the Flow	56											
Listings 1-2							■		■	■	■	■

Note
1. For use with *View*

HINTS & TIPS

See Hints & Tips, page 41

Listing 1. Disc catalogue message

```
   10 REM Catalogue Message
   20 REM by Martin Hesketh
   30 REM for B/B+/E/M/C with DFS
   40 REM (c) Acorn User Sept 1988
   50 :
   60 MODE 7
   70 VDU 23,1,0;0;0;0;0
   80 S%=&900
   90 :
  100 REPEAT
  110 INPUT '"How many Files Free (0-31)
:"F%
  120 UNTIL F%>=0 AND F%<32
  130 FC%=10+(31-F%)*5
  140 PRINT "Max Message Length: ";FC%;"
 Characters"
  150 :
  160 INPUT '"Which Mode for catalogue d
isplay: "M%
  170 PRINT ''"Put Blank,Formatted disc
in Drive 0,"'"then Press any key"
  180 *FX 21
  190 K%=GET
  200 :
  210 MODE M%
  220 A$="":B$=""
  230 REPEAT
  240 *FX 21
  250 K%=GET
  260 IF K%=127 PROCdelete
  270 IF K%=13 PROCreturn
  280 IF K%>31 AND K%<127 AND LENA$<FC%
 A$=A$+CHR$K%:B$=B$+CHR$K%:VDU K%
  290 UNTIL K%=0
  300 :
  310 A$=LEFT$(A$+STRING$(250-LENA$," ")
,FC%)
  320 REPEAT
  330 PROCloadcat
  340 UNTIL FNempty
  350 $S%="  "+LEFT$(A$,6)
  360 $(S%+256)=MID$(A$,7,3)
  370 FOR I%=10 TO FC%-5 STEP 5
  380 $(S%+(I%-10)/5*8+8)=CHR$6+MID$(A$,
I%,5)+CHR$21+CHR$(48+(I%-10)/5)
  390 ?(S%+(I%-10)/5*8+271)=2
  400 NEXT I%
  410 ?S%=22
  420 S%?1=M%
  430 $(S%+256)=MID$(A$,7,3)
  440 ?(S%+259)=21
  450 ?(S%+261)=(31-F%)*8
  460 PROCsavecat
  470 END
  480 :
  490 DEF PROCloadcat
  500 ?&70=0
  510 !&71=S%
  520 ?&75=3
  530 ?&76=&53
  540 ?&77=0
  550 ?&78=0
  560 ?&79=&22
  570 A%=&7F
  580 X%=&70:Y%=0
  590 CALL &FFF1
```

Continued ▶

◄ Hints & Tips listing 1 continued

```
600 ENDPROC
610 :
620 DEF PROCsavecat
630 ?&76=&4B
640 A%=&7F
650 X%=&70:Y%=0
660 CALL &FFF1
670 ENDPROC
680 :
690 DEF PROCdelete
700 A$=LEFT$(A$,LENA$-1)
710 IF RIGHT$(B$,1)=CHR$10 B$=LEFT$(B$
,LENB$-2) ELSE B$=LEFT$(B$,LENB$-1)
720 CLS
730 PRINT B$;
740 ENDPROC
750 :
760 DEF PROCreturn
770 IF LENA$>=FC% ENDPROC
780 A$=A$+CHR$13
790 B$=B$+CHR$13+CHR$10
800 PRINT
810 ENDPROC
820 :
830 DEF FNempty
840 IF S%?&105 ELSE =TRUE
850 PRINT "WARNING : Disc not empty"
860 PRINT "(contains ";(S%?&105)/8;" f
iles)"
870 PRINT "If you proceed, you will de
stroy the files"
880 PRINT "Proceed (Y/N) ";
890 K%=GET AND &DF
900 IF K%<>89 THEN K%=78
910 VDU K%
920 =(K%=89)
```

Listing 2. Immediate directory wipe

```
10 REM DirWipe
20 REM by J Abley
30 REM for B/B+/E/M/C/A with ADFS/Net
40 REM (c) Acorn User Sept 1988
50 :
120 PROCoscli("DIR "+root$)
130 PRINT '"Confirm before deleting fi
les? ";
140 query%=FNyes
150 PRINT
160 dummy%=FNdelete(0)
170 IF root$="$" GOTO 200
180 PRINT '"Delete ";FNd(root$);" also
? ";
190 IF FNyes THEN PROCoscli("ACCESS $.
"+root$):PROCoscli("DELETE $."+root$)
200 PRINT '"DirWipe completed."
210 END
220 :
230 DEF FNdelete(width%)
240 LOCAL A%,X%,Y%,F%,dir%
250 dir%=0
260 REPEAT
270 A%=8
280 X%=block% MOD &100
290 Y%=block% DIV &100
300 block%!1=spare%
310 ?block%=0
320 block%!5=1
330 block%!9=dir%
340 F%=((USR(&FFD1) AND &1000000)<>0)
350 IF F%=FALSE THEN PROCdodel
360 UNTIL F%
370 =dir%
380 :
390 DEF PROCdodel
400 LOCAL A%,X%,Y%,T%,F$
410 spare%?(1+?spare%)=&D
420 F$=$(spare%+1)
430 !block%=spare%+1
440 A%=5
450 X%=block% MOD &100
460 Y%=block% DIV &100
470 T%=((USR(&FFDD) AND &FF)=2)
480 PROCoscli("ACCESS "+F$)
490 PRINT TAB(width%);FNtrunc(F$);
500 IF T% THEN PROCdirectory ELSE PROC
file
510 ENDPROC
520 :
530 DEF PROCfile
540 IF NOT(query%) THEN PROCoscli("DEL
ETE "+F$):PRINT:ENDPROC
550 PRINT "? ";
560 IF FNyes THEN PROCoscli("DELETE "+
F$) ELSE dir%=dir%+1
570 ENDPROC
580 :
590 DEF PROCdirectory
600 PROCoscli("dir "+F$)
610 PRINT
620 dummy%=FNdelete(width%+1)
630 *DIR ^
640 IF dummy%=0 THEN PROCoscli("DELETE
 "+F$) ELSE dir%=dir%+1
650 ENDPROC
660 :
670 DEF PROCoscli($oscom%)
680 LOCAL X%,Y%
690 X%=oscom% MOD &100
700 Y%=oscom% DIV &100
710 CALL &FFF7
720 ENDPROC
730 :
740 DEF FNtrunc(A$)
750 IF INSTR(A$," ") THEN =LEFT$(A$,IN
STR(A$," ")-1) ELSE =A$
760 :
770 DEF FNyes
780 LOCAL A$
790 REPEAT
800 A$=CHR$(GET AND &DF)
810 UNTIL INSTR("YN",A$)
820 PRINT A$
830 =(A$="Y")
840 :
850 DEF FNd(d$)
860 REPEAT
870 IF INSTR(d$,".")=0 THEN =d$
880 d$=RIGHT$(d$,LENd$-1)
890 UNTIL FALSE
```

Listing 3. Speaker volume control

```
   10 REM Volume Control ROM
   20 REM by Martin Hesketh
   30 REM for M/C only
   40 REM (c) Acorn User Sept 1988
   50 :
   60 title$="Volume Control Rom Version 1.0"
   70 copy$="(C) 1988 Martin Hesketh"
   80 handle$="4"
   90 FOR pass=4 TO 7 STEP 3
  100 P%=&8000
  110 O%=&3000
  120 :
  130 [OPT pass
  140 EQUB &4C
  150 EQUW &00
  160 EQUB &4C
  170 EQUW service
  180 EQUB 130
  190 EQUB (9+LEN title$)MOD 256
  200 EQUB &00
  210 EQUS title$+CHR$(0)
  220 EQUS copy$+CHR$(0)
  230 .service
  240 PHA
  250 PHX
  260 PHY
  270 CMP #&15
  280 BEQ jmpcheck
  290 CMP #9
  300 BEQ help
  310 CMP #&27
  320 BEQ init
  330 .exit
  340 PLY
  350 PLX
  360 PLA
  370 RTS
  380 .jmpcheck
  390 JMP check
  400 .help
  410 JSR movecursor
  420 LDA #8
  430 STA &F6
  440 LDA #&80
  450 STA &F7
  460 JSR print
  470 LDA &8007
  480 STA &F6
  490 JSR print
  500 JSR &FFEE
  510 BRA exit
  520 .print
  530 LDY #0
  540 .loop
  550 INY
  560 LDA (&F6),Y
  570 JSR &FFEE
  580 CMP #0
  590 BNE loop
  600 JSR movecursor
  610 RTS
  620 .movecursor
  630 LDA #13
  640 JSR &FFEE
  650 LDA #10
  660 JSR &FFEE
  670 RTS
  680 .init
  690 LDA #22
  700 LDX #1
  710 JSR &FFF4
  720 JMP exit
  730 .calc
  740 LDA current
  750 STA address
  760 LDY #4
  770 .cloop
  780 CLC
  790 ROL address
  800 DEY
  810 CPY #0
  820 BNE cloop
  830 RTS
  840 .pluss
  850 JSR calc
  860 LDX address
  870 LDA &8BB,X
  880 CMP #126
  890 BEQ check2
  900 INC &8BB,X
  910 JMP check2
  920 .minuss
  930 JSR calc
  940 LDX address
  950 LDA &8BB,X
  960 BEQ check1
  970 DEC &8BB,X
  980 JMP check1
  990 .plusf
 1000 JSR calc
 1010 LDX address
 1020 LDA &8BC,X
 1030 CMP #126
 1040 BEQ check3
 1050 INC &8BC,X
 1060 JMP check3
 1070 .minusf
 1080 JSR calc
 1090 LDX address
 1100 LDA &8BC,X
 1110 BEQ jump
 1120 DEC &8BC,X
 1130 .jump
 1140 JMP exit
 1150 .check
 1160 LDA #129
 1170 LDX #196
 1180 LDY #255
 1190 JSR &FFF4
 1200 CPX #255
 1210 BEQ minuss
 1220 .check1
 1230 LDA #129
 1240 LDX #197
 1250 LDY #255
 1260 JSR &FFF4
 1270 CPX #255
 1280 BEQ pluss
 1290 .check2
 1300 LDA #129
 1310 LDX #181
 1320 LDY #255
 1330 JSR &FFF4
 1340 CPX #255
 1350 BEQ plusf
 1360 .check3
 1370 LDA #129
 1380 LDX #164
 1390 LDY #255
 1400 JSR &FFF4
 1410 CPX #255
 1420 BEQ minusf
 1430 LDA #129
 1440 LDX #148
 1450 LDY #255
 1460 JSR &FFF4
 1470 CPX #255
 1480 BNE notone
 1490 LDA #1
 1500 STA current
 1510 .notone
 1520 LDA #129
 1530 LDX #131
 1540 LDY #255
 1550 JSR &FFF4
 1560 CPX #255
 1570 BNE nottwo
 1580 LDA #2
 1590 STA current
 1600 .nottwo
 1610 LDA #129
 1620 LDX #147
 1630 LDY #255
 1640 JSR &FFF4
 1650 CPX #255
 1660 BNE notthree
 1670 LDA #3
 1680 STA current
 1690 .notthree
 1700 LDA #129
 1710 LDX #133
 1720 LDY #255
 1730 JSR &FFF4
 1740 CPX #255
 1750 BNE notfour
 1760 LDA #4
 1770 STA current
 1780 .notfour
 1790 JMP exit
 1800 .address
 1810 EQUB 0
 1820 .current
 1830 EQUB 1
 1840 :
 1850 ]
 1860 NEXT pass
 1870 PROCchecksum(&3000,current-P%+O%,&C058)
 1880 OSCLI("SRWRITE 3000 "+STR$~(O%)+" 8000 "+handle$)
 1890 PRINT "ROM now loaded in Sideways RAM bank ";handle$
 1900 PRINT "Press CTRL-BREAK to use the ROM"
 1910 PRINT "To save, type *SAVE VROM 3000 "+STR$~(O%)
 1920 END
 1930 :
 1940 DEF PROCchecksum(S%,E%,R%)
 1950 LOCAL I%,T%
 1960 FOR I%=S% TO E%
 1970 T%=T%+?I%
 1980 NEXT
 1990 IF T%<>R% THEN PRINT "Checksum error"'"Check listing":END
 2000 ENDPROC
```

See Archimedes Agora, page 48

Listing 1. Pointer editor

```
10 REM Agora - listing 1
20 REM Mouse Pointer Editor
30 REM by Dave Lawrence & Dave Acton
40 REM for Archimedes only
50 REM (c) Acorn User September 1988
60 :
70 MODE 9
80 OFF
90 PROCinit
100 oldx%=16:oldy%=16:cx%=16:cy%=16
110 curp%=0:curcol%=3
120 ON ERROR
130 GCOL 3
140 MOUSE TO 16*32,16*32
150 ox%=1024+2*32:oy%=1024-6*32
160 REPEAT
170 PROCinfo("Edit mode",10)
180 PROCdisplay
190 PROCcolours
200 REPEAT
210 oldx%=cx%:oldy%=cy%
220 k%=INKEY(1)
230 MOUSE mx,my,mb
240 cx%=mx/32:cy%=my/32
250 CASE k% OF
260 WHEN 90,122:MOUSE TO mx-32,my
270 WHEN 88,120:MOUSE TO mx+32,my
280 WHEN 47,63:MOUSE TO mx,my-32
290 WHEN 39,34:MOUSE TO mx,my+32
300 WHEN 84,116:PROCtest
310 WHEN 83,115:PROCsave
320 WHEN 76,108:PROCload
330 WHEN 67,99:PROCbox(34,2+curp%*6,4,4,0)
340 WHEN 129,130,131,132:curcol%=k%-129:PROCcolours
350 WHEN 133,134,135,136:
360 PROCsq(x%(curp%),31-y%(curp%),8)
370 curp%=k%-133
380 ox%=1024+2*32:oy%=1024-(curp%+1)*6*32
390 PROCdisplay
400 ENDCASE
410 IF INKEY-52 PROCalter(0)
420 IF INKEY-84 PROCalter(1)
430 IF INKEY-101 PROCalter(2)
440 IF (mb AND 4) OR INKEY-74 PROCdot(curcol%)
450 IF (mb AND 2) OR INKEY-63 THEN
460 PROCsq(x%(curp%),31-y%(curp%),8)
470 x%(curp%)=cx%:y%(curp%)=31-cy%
480 PROCdisplay
490 ENDIF
500 IF (mb AND 1) OR INKEY-90 PROCdot(0)
510 IF cx%<>oldx% OR cy%<>oldy% PROCdisplay
520 UNTIL INSTR("SsLlTtCcQq",CHR$(k%))>0
530 UNTIL k%=ASC"Q" OR k%=ASC"q"
540 VDU 26,20,12
550 *FX 4
560 *FX 221,1
570 *FX 225,1
580 ON
590 END
600 :
610 DEF PROCinit
620 DIM x%(3),y%(3),code% 1000
630 *FX 221,128
640 *FX 225,128
650 *FX 4,2
660 !code%=148
670 code%!4=-1
680 SYS "OS_ReadVduVariables",code%,code%+8
690 base%=code%!8
700 read=0:write=1:byte=2:temp=3
710 count=4:hcount=5:vcount=6:was=7
720 FOR pass%=0 TO 2 STEP 2
730 P%=code%
740 [OPT pass%
750 MOV vcount,#32
760 LDR write,writestart
770 .vloop
780 MOV hcount,#0
790 .hloop
800 LDRB byte,[read,hcount]
810 MOV count,#3
820 .triple
830 AND temp,byte,#%00001111
840 LDRB was,[write,#1]
850 AND was,was,#%11110000
860 ORR was,was,temp
870 STRB was,[write,#1]
880 ORR temp,temp,temp,ASL #4
890 STRB temp,[write]
900 AND temp,byte,#%11110000
910 MOV temp,temp,LSR #4
920 LDRB was,[write,#3]
930 AND was,was,#%11110000
940 ORR was,was,temp
950 STRB was,[write,#3]
960 ORR temp,temp,temp,ASL #4
970 STRB temp,[write,#2]
980 ADD write,write,#160
990 SUBS count,count,#1
1000 BNE triple
1010 SUB write,write,#(3*160)-4
1020 ADD hcount,hcount,#1
1030 CMP hcount,#16
1040 BNE hloop
1050 ADD write,write,#(4*160)-64
1060 ADD read,read,#160
1070 SUBS vcount,vcount,#1
1080 BNE vloop
1090 MOV R15,R14
1100 :
1110 .writestart
1120 EQUD base%+48+16*160
1130 :
1140 .extrabit
1150 STMFD R13!,{R14}
1160 ADR R0,rgb%
1170 MOV R1,#18
1180 SWI "OS_WriteN"
1190 MOV R0,#106
1200 ADR R1,block+1
1210 LDRB R1,[R1]
1220 SWI "OS_Byte"
1230 ADR R0,buffer
1240 ADR R1,whereis
1250 STR R0,[R1]
1260 MOV R0,#21
1270 ADR R1,block
1280 SWI "OS_Word"
1290 LDMFD R13!,{R15}
1300 EQUS"DL"
1310 .block
1320 EQUD 0:EQUB 0:EQUB 0
1330 .whereis
1340 EQUD 0
1350 ALIGN
1360 .rgb%
1370 EQUB 19:EQUB 1:EQUB 25:EQUB &F0:EQUB 0:EQUB 0
1380 EQUB 19:EQUB 2:EQUB 25:EQUB &F0:EQUB &F0:EQUB 0
```

Continued ▶

◀ Arc Agora listing 1 continued

```
1390 EQUB 19:EQUB 3:EQUB 25:EQUB &F0:EQ
UB &F0:EQUB &F0
1400 ALIGN
1410 .buffer
1420 EQUS STRING$(128," ")
1430 EQUS STRING$(128," ")
1440 ]NEXT
1450 codelen%=buffer-extrabit
1460 FOR c%=8 TO 14
1470 READ r%,g%,b%
1480 COLOUR c%,r%,g%,b%
1490 NEXT
1500 FOR n%=0 TO 3
1510 PROCbox(34,2+n%*6,4,4,0)
1520 NEXT
1530 PROCbox(1,12,4,1,0)
1540 PROCbox(1,14,4,1,0)
1550 PROCbox(1,16,4,1,0)
1560 PROCbox(1,20,3,3,14)
1570 FOR x%=0 TO 1023
1580 PROCsq(x% MOD 32,x% DIV 32,8)
1590 NEXT
1600 MOUSE RECTANGLE 0,0,1023,1023
1610 ENDPROC
1620 :
1630 DEF PROCsq(x%,y%,c%)
1640 GCOL c%
1650 RECTANGLE 384+x%*16-4,512-64+y%*16
,16,16
1660 ENDPROC
1670 :
1680 DEF PROCdot(c%)
1690 GCOL c%
1700 POINT ox%+cx%*4,oy%+cy%*4
1710 A%=base%+34*4+16*160+curp%*48*160
1720 CALL code%
1730 PROCdisplay
1740 ENDPROC
1750 :
1760 DEF FNmake
1770 PROCinfo("Please wait...",10)
1780 mx%=0
1790 FOR y%=0 TO 31
1800 x%=32
1810 REPEAT
1820 x%-=1
1830 UNTIL POINT(ox%+x%*4,oy%+y%*4) OR
x%=0
1840 IF x%>mx% mx%=x%
1850 NEXT
1860 IF x%(curp%)>mx% mx%=x%(curp%)
1870 my%=0
1880 FOR x%=0 TO 31
1890 y%=32
1900 REPEAT
1910 y%-=1
1920 UNTIL POINT(ox%+x%*4,oy%+y%*4) OR
y%=0
1930 IF y%>my% my%=y%
1940 NEXT
1950 IF y%(curp%)>my% my%=y%(curp%)
1960 len%=0
1970 mx%=4*((mx% DIV 4)+1)
1980 FOR y%=my% TO 0 STEP -1
1990 FOR x%=0 TO (mx% DIV 4)-1
2000 val%=0
2010 FOR p%=0 TO 3
2020 val%+=POINT(ox%+16*x%+4*p%,oy%+4*y
%)<<(2*p%)
2030 NEXT
2040 len%?buffer=val%
2050 len%+=1
2060 NEXT
2070 NEXT
2080 ?block=0
2090 block?1=curp%+1
2100 block?2=mx%/4
2110 block?3=my%+1
2120 block?4=x%(curp%)
2130 block?5=y%(curp%)
2140 block!6=buffer
2150 =len%
2160 :
2170 DEF PROCtest
2180 dummy%=FNmake
2190 PROCinfo("Testing: press Space Bar
to end",10)
2200 SYS "OS_Byte",106,curp%+1
2210 SYS "OS_Word",21,block
2220 REPEAT
2230 UNTIL INKEY(0)=32
2240 *FX 106,0
2250 ENDPROC
2260 :
2270 DEF PROCsave
2280 PROCinfo("Save as: ",14)
2290 INPUT""f$
2300 OSCLI("SAVE "+f$+" "+STR$~extrabit
+" +"+STR$~(FNmake+codelen%))
2310 OSCLI("SetType "+f$+" FFC")
2320 ENDPROC
2330 :
2340 DEF PROCload
2350 PROCinfo("Load: ",14)
2360 INPUT""f$
2370 OSCLI"LOAD "+f$+" "+STR$~(extrabit
)
2380 PROCsq(x%(curp%),31-y%(curp%),8)
2390 mx%=block?2*4
2400 my%=block?3-1
2410 x%(curp%)=block?4
2420 y%(curp%)=block?5
2430 len%=0
2440 PROCbox(34,2+curp%*6,4,4,0)
2450 FOR y%=my% TO 0 STEP -1
2460 FOR x%=0 TO mx%/4-1
2470 FOR p%=0 TO 3
2480 GCOL (len%?buffer)>>(2*p%) AND 3
2490 POINT ox%+16*x%+4*p%,oy%+4*y%
2500 NEXT
2510 len%+=1
2520 NEXT
2530 NEXT
2540 ENDPROC
2550 :
2560 DEF PROCdisplay
2570 PROCsq(oldx%,oldy%,8)
2580 PROCsq(x%(curp%),31-y%(curp%),11)
2590 PROCsq(cx%,cy%,9)
2600 A%=base%+34*4+16*160+curp%*48*160
2610 CALL code%
2620 COLOUR 142
2630 PRINTTAB(2,21);curp%+1
2640 ENDPROC
2650 :
2660 DEF PROCinfo(t$,c%)
2670 PROCbox(1,27,38,3,c%)
2680 COLOUR c%+128
2690 PRINTTAB(20-LENt$/2,28)t$;
2700 ENDPROC
2710 :
2720 DEF PROCbox(x%,y%,w%,h%,c%)
2730 FOR bx%=0 TO 8 STEP 8
2740 GCOL bx%/8*c%
2750 RECTANGLE FILL 32*x%-bx%,1024-(y%+
h%)*32-16+bx%,32*w%+12,32*h%+12
2760 GCOL 8
```

Continued ▶

◄ Arc Agora listing 1 continued

```
2770 RECTANGLE 32*x%-bx%,1024-(y%+h%)*32-16+bx%,32*w%+12,32*h%+12
2780 NEXT
2790 ENDPROC
2800 :
2810 DEF PROCcolours
2820 WAIT
2830 FOR b%=1 TO 3
2840 MOUSE COLOUR b%,rgb%?(b%*6-3),rgb%?(b%*6-2),rgb%?(b%*6-1)
2850 COLOUR b%,rgb%?(b%*6-3),rgb%?(b%*6-2),rgb%?(b%*6-1)
2860 PROCbox(b%*2-1,8,1,1,b%)
2870 NEXT
2880 PROCbox(1,2,3,3,curcol%)
2890 FOR b%=0 TO 2
2900 GCOL 11+b%
2910 s%=rgb%?(curcol%*6-3+b%)/&F0*128
2920 IF s%>0 RECTANGLE FILL 32,1024-13*32-64*b%,s%-1,31
2930 GCOL 8
2940 IF s%<127 RECTANGLE FILL 32+s%,1024-13*32-64*b%,127-s%,31
2950 NEXT
2960 ENDPROC
2970 :
2980 DEF PROCalter(c%)
2990 IF INKEY-26 AND rgb%?(6*curcol%-3+c%)>0 rgb%?(6*curcol%-3+c%)-=8
3000 IF INKEY-122 AND rgb%?(6*curcol%-3+c%)<&F0 rgb%?(6*curcol%-3+c%)+=8
3010 PROCcolours
3020 ENDPROC
3030 :
3040 DATA &50,&50,&50,&D0,&D0,&D0,0,0,&80
3050 DATA &F0,0,0,0,&F0,0,0,0,&F0,&60,0,0
```

Listing 2. Windows using sprites

```
 10 REM Agora - listing 2
 20 REM Sprite windows
 30 REM by Simon Pettitt
 40 REM for Archimedes only
 50 REM (c) Acorn User September 1988
 60 :
 70 MODE 12
 80 OFF
 90 *SNEW
100 PROCdraw(157)
110 wait=INKEY(100)
120 PROCwindow(500,400,700,900,4,1)
130 COLOUR 132:COLOUR 7
140 PROCtext(5,17,34,"WINDOWS")
150 wait=INKEY(100)
160 PROCwindow(50,150,900,800,1,2)
170 VDU 24,60;160;890;790;
180 PROCdraw(157)
190 VDU 26
200 wait=INKEY(100)
210 PROCwindow(100,100,280,500,3,3)
220 COLOUR 131:COLOUR 4
230 PROCtext(17,27,7,"Acorn User")
240 wait=INKEY(100)
250 PROCclose(100,100,3)
260 wait=INKEY(100)
270 PROCclose(50,150,2)
280 wait=INKEY(100)
290 PROCclose(500,400,1)
300 *SNEW
310 END
320 :
330 DEF PROCdraw(plotnumber)
340 FOR wait=1 TO 80
350 GCOL RND(6)+1
360 x%=RND(1279):y%=RND(1023):r%=RND(75)
370 MOVE x%,y%
380 PLOT plotnumber,(x%+r%),(y%+r%)
390 NEXT
400 ENDPROC
410 :
420 DEF PROCwindow(lx%,ly%,tx%,ty%,col%,number)
430 MOVE lx%,ly%:MOVE tx%,ty%
440 VDU 23,27,1,number|
450 MOVE lx%,ly%
460 GCOL col%
470 PLOT 101,tx%,ty%
480 ENDPROC
490 :
500 DEF PROCclose(lx%,ly%,number)
510 VDU 23,27,0,number,0,0,0,0,0,0
520 PLOT &ED,lx%,ly%
530 ENDPROC
540 :
550 DEF PROCtext(y1%,y2%,x%,text$)
560 FOR a%=y1% TO y2%
570 PRINT TAB(x%,a%);text$
580 NEXT
590 ENDPROC
```

Listing 3. Passing parameters to Basic programs

```
 10 REM Agora - listing 3
 20 REM Basic parameters
 30 REM by Mark Twells
 40 REM for Archimedes only
 50 REM (c) Acorn User September 1988
 60 :
 70 command$=FNcommandline
 80 PRINT'''"You typed: "command$
 90 END
100 :
110 DEF FNcommandline
120 LOCAL i,numspaces,command
130 SYS "OS_GetEnv" TO command
140 i=0
150 WHILE command?i<>0
160 i+=1
170 ENDWHILE
180 command?i=13
190 numspaces=0
200 i=0
210 WHILE numspaces<3
220 IF command?i=&20 numspaces+=1
230 i+=1
240 ENDWHILE
250 =$(command+i)
```

See Curving the Bezier way page 54

Listing 1. Simple Bezier curves

```
   10 REM Bezier Curves
   20 REM by G Blanchard
   30 REM for B/B+/M/C/E/A
   40 REM (c) Acorn User September 1988
   50 :
   60 MODE 0
   80 DIM x(3),y(3),a(3),b(3)
   90 x(0)=0:y(0)=511
  100 x(3)=1279:y(3)=511
  110 n=100
  120 :
  130 REPEAT
  140 INPUT "Enter two coordinates (four
 numbers)=>"x(1),y(1),x(2),y(2)
  150 CLS
  160 MOVE x(0),y(0)
  170 a(0)=x(0)
  180 b(0)=y(0)
  190 a(1)=x(1)+2*x(0)
  200 b(1)=y(1)+2*y(0)
  210 a(2)=x(2)+2*x(3)
  220 b(2)=y(2)+2*y(3)
  230 a(3)=x(3)
  240 b(3)=y(3)
  250 :
  260 FOR I%=0 TO n
  270 t=I%/n
  280 t1=1-t
  290 x=a(0)*t1^3+a(1)*t*t1^2+a(2)*t1*t^
2+a(3)*t^3
  300 y=b(0)*t1^3+b(1)*t*t1^2+b(2)*t1*t^
2+b(3)*t^3
  310 DRAW x,y
  320 NEXT I%
  330 :
  340 UNTIL FALSE
```

Lisitng 2. Using Bezier curves for solids

```
   10 REM Bezier surface representation
   20 REM by George Blanchard
   30 REM for B/B+/M/C/E/A
   40 REM (c) Acorn User September 1988
   50 :
   60 MODE 0
   70 L%=4
   80 N%=25
   90 DIM x(2,3,3),a1(2,3,3),u(2,3),a(2,
3),p(2)
  100 DIM r(1,2,L%,N%)
  110 :
  120 FOR I%=0 TO 3
  130 FOR J%=0 TO 3
  140 FOR K%=0 TO 2
  150 READ x(K%,I%,J%)
  160 NEXT
  170 NEXT
  180 NEXT
  190 :
  200 VDU 29,160;200;
  210 PROCpatch
  220 :
  230 REPEAT
  240 INPUT "Hit return for another view
"a$
  250 PROCredraw(0,1)
  260 INPUT "Hit return for another view
"a$
  270 PROCredraw(0,2)
  280 INPUT "Hit return for another view
"a$
  290 PROCredraw(2,1)
```

Continued ▶

◀ Bezier listing 2 continued

```
  300 INPUT "Hit return for isometric vi
ew"a$
  310 PROCiso
  320 UNTIL FALSE
  330 END
  340 :
  350 DEF PROCpatch
  360 PROCcoeffs1
  370 FOR T%=0 TO L%
  380 t=T%/L%
  390 PROCval(t)
  400 PROCcoeffs
  410 FOR S%=0 TO N%
  420 s=S%/N%
  430 PROCpoint(s)
  440 FOR I%=0 TO 2
  450 r(0,I%,T%,S%)=p(I%)
  460 NEXT
  470 IF S%=0 THEN MOVE p(0),p(1) ELSE D
RAW p(0),p(1)
  480 NEXT
  490 NEXT
  500 PROCcoeffs2
  510 FOR T%=0 TO L%
  520 t=T%/L%
  530 PROCval(t)
  540 PROCcoeffs
  550 FOR S%=0 TO N%
  560 s=S%/N%
  570 PROCpoint(s)
  580 FOR I%=0 TO 2
  590 r(1,I%,T%,S%)=p(I%)
  600 NEXT
  610 IF S%=0 THEN MOVE p(0),p(1) ELSE D
RAW p(0),p(1)
  620 NEXT
  630 NEXT
  640 ENDPROC
  650 :
  660 DEF PROCcoeffs1
  670 FOR K%=0 TO 2
  680 FOR I%=0 TO 3
  690 a1(K%,I%,0)=x(K%,I%,0)
  700 a1(K%,I%,1)=x(K%,I%,1)+x(K%,I%,0)+
x(K%,I%,0)
  710 a1(K%,I%,2)=x(K%,I%,2)+x(K%,I%,3)+
x(K%,I%,3)
  720 a1(K%,I%,3)=x(K%,I%,3)
  730 NEXT
  740 NEXT
  750 ENDPROC
  760 :
  770 DEF PROCcoeffs2
  780 FOR K%=0 TO 2
  790 FOR I%=0 TO 3
  800 a1(K%,I%,0)=x(K%,0,I%)
  810 a1(K%,I%,1)=x(K%,1,I%)+x(K%,0,I%)+
x(K%,0,I%)
  820 a1(K%,I%,2)=x(K%,2,I%)+x(K%,3,I%)+
x(K%,3,I%)
  830 a1(K%,I%,3)=x(K%,3,I%)
  840 NEXT
  850 NEXT
  860 ENDPROC
  870 :
  880 DEF PROCval(t)
  890 LOCAL t1
  900 t1=1-t
  910 FOR I%=0 TO 2
  920 FOR J%=0 TO 3
  930 u(I%,J%)=a1(I%,J%,0)*t1*t1*t1+a1(I
%,J%,1)*t*t1*t1+a1(I%,J%,2)*t1*t*t+a1(I%
,J%,3)*t*t*t
  940 NEXT
```

Continued ▶

◀ Bezier listing 2 continued

```
 950 NEXT
 960 ENDPROC
 970 :
 980 DEF PROCcoeffs
 990 FOR I%=0 TO 2
1000 a(I%,0)=u(I%,0)
1010 a(I%,1)=u(I%,1)+u(I%,0)+u(I%,0)
1020 a(I%,2)=u(I%,2)+u(I%,3)+u(I%,3)
1030 a(I%,3)=u(I%,3)
1040 NEXT
1050 ENDPROC
1060 :
1070 DEF PROCpoint(s)
1080 LOCAL s1
1090 s1=1-s
1100 FOR I%=0 TO 2
1110 p(I%)=a(I%,0)*s1*s1*s1+a(I%,1)*s*s
1*s1+a(I%,2)*s1*s*s+a(I%,3)*s*s*s
1120 NEXT
1130 ENDPROC
1140 :
1150 DEF PROCredraw(x%,y%)
1160 LOCAL ax$
1170 ax$="xyz"
1180 CLS
1190 PRINT MID$(ax$,x%+1,1);" >       "
;MID$(ax$,y%+1,1);" ^"
1200 FOR I%=0 TO L%
1210 MOVE r(0,x%,I%,0),r(0,y%,I%,0)
1220 FOR J%=0 TO N%
1230 DRAW r(0,x%,I%,J%),r(0,y%,I%,J%)
1240 NEXT
1250 NEXT
1260 FOR I%=0 TO L%
1270 MOVE r(1,x%,I%,0),r(1,y%,I%,0)
1280 FOR J%=0 TO N%
1290 DRAW r(1,x%,I%,J%),r(1,y%,I%,J%)
1300 NEXT
1310 NEXT
1320 ENDPROC
1330 :
1340 DEF PROCiso
1350 LOCAL c,s,x,y
1360 s=1/2
1370 c=SQR(3)/2
1380 CLS
1390 PRINT "Isometric view."
1400 FOR I%=0 TO L%
1410 FOR J%=0 TO N%
1420 x=c*(r(0,0,I%,J%)+r(0,2,I%,J%))
1430 y=r(0,1,I%,J%)+s*(r(0,2,I%,J%)-r(0
,0,I%,J%))
1440 IF J%=0 THEN MOVE x,y ELSE DRAW x,
y
1450 NEXT
1460 NEXT
1470 FOR I%=0 TO L%
1480 FOR J%=0 TO N%
1490 x=c*(r(1,0,I%,J%)+r(1,2,I%,J%))
1500 y=r(1,1,I%,J%)+s*(r(1,2,I%,J%)-r(1
,0,I%,J%))
1510 IF J%=0 THEN MOVE x,y ELSE DRAW x,
y
1520 NEXT
1530 NEXT
1540 ENDPROC
1541 :
1550 DATA 100,100,0
1560 DATA 400,400,300
1570 DATA 400,400,300
1580 DATA 700,100,0
1590 :
1600 DATA 100,400,200
1610 DATA 400,700,600
1620 DATA 400,700,600
1630 DATA 700,400,200
1640 :
1650 DATA 100,400,400
1660 DATA 400,700,0
1670 DATA 400,700,0
1680 DATA 700,400,400
1690 :
1700 DATA 100,100,600
1710 DATA 600,400,300
1720 DATA 400,400,300
1730 DATA 700,100,600
```

See Spaced Out, page 76

Listing 1. Microspacing in View

```
   10 REM Micro spacing
printer driver
   20 REM by Graham Bell
   30 REM for B/B+/M/C/E
/A
   40 REM (C) Acorn User
 September 1988
   50 :
   60 PROCvars
   70 PROCclearmem
   80 PROCassemble
   90 PROCchecksum
  100 PROCsave
  110 END
  120 :
  130 DEF PROCvars
  140 osasci=&FFE3
  150 oswrch=&FFEE
  160 osbyte=&FFF4
  170 origin=&0400
  180 pitch=&0C
  190 ENDPROC
  200 :
  210 DEF PROCclearmem
  220 DIM code &FF
  230 FOR I%=0 TO &FF
  240 code?I%=0
  250 NEXT
  260 ENDPROC
  270 :
  280 DEF PROCassemble
  290 FOR pass=4 TO 7 ST
EP 3
  300 P%=origin
  310 O%=code
  320 :
  330 [OPT pass
  340 JMP charop
  350 JMP on
  360 JMP off
  370 JMP sethmi
  380 LDY #&01
  390 RTS
  400 :
  410 .tempa
  420 BRK
  430 .tempx
  440 BRK
  450 .tempy
  460 BRK
  470 .ulflag
  480 BRK
  490 .bdflag
  500 BRK
  510 :
  520 .grafix
  530 OPT FNequb(&1B)
  540 OPT FNequs("^")
  550 OPT FNequb(&01)
  560 .hmi
  570 OPT FNequw(&0000)
  580 .ulon
  590 OPT FNequb(&1B)
  600 OPT FNequs("-")
  610 OPT FNequb(&01)
  620 .ulof
  630 OPT FNequb(&1B)
  640 OPT FNequs("-")
  650 BRK
  660 .bdon
  670 OPT FNequb(&1B)
  680 OPT FNequs("E")
  690 .bdof
  700 OPT FNequb(&1B)
  710 OPT FNequs("F")
  720 .sterl
  730 OPT FNequb(&1B)
  740 OPT FNequs("R")
  750 OPT FNequb(&03)
  760 OPT FNequs("#")
  770 OPT FNequb(&1B)
  780 OPT FNequs("R")
  790 BRK
  800 .space
  810 OPT FNequs(" ")
  820 .end
  830 :
  840 .on
  850 LDX #&0A
  860 BNE skip
  870 .off
  880 LDX #&00
  890 .skip
  900 LDA #&03
  910 JMP osbyte
  920 :
  930 .eprint
  940 LDA origin,X
  950 JSR oswrch
  960 INX
  970 DEY
  980 BNE eprint
  990 RTS
 1000 :
 1010 .adjust
 1020 LDA hmi
 1030 BEQ noadj
 1040 LDX #grafix-origin
 1050 LDY #ulon-grafix
 1060 JSR eprint
 1070 LDY hmi
 1080 .extras
```

Continued ▶

YELLOW PAGES

WORDPROCESSING

◀ Spaced Out listing 1 continued

```
1090 LDA #&00
1100 JSR osasci
1110 LDA ulflag
1120 BEQ noline
1130 LDA #&80
1140 .noline
1150 JSR osasci
1160 DEY
1170 BNE extras
1180 .noadj
1190 RTS
1200 :
1210 .sethmi
1220 TXA
1230 SEC
1240 SBC #pitch
1250 STA hmi
1260 RTS
1270 :
1280 .charop
1290 STA tempa
1300 STX tempx
1310 STY tempy
1320 AND #&FF
1330 BMI highl
1340 CMP #ASC "!"
1350 BEQ pad
1360 CMP #ASC "£"
1370 BEQ pound
1380 LDA tempa
1390 .charol
1400 JSR osasci
1410 JSR adjust
1420 .return
1430 LDY tempy
1440 LDX tempx
1450 LDA tempa
1460 RTS
1470 :
1480 .pound
1490 LDX #sterl-origin
1500 LDY #space-sterl
1510 JMP charol
1520 :
1530 .pad
1540 LDX #space-origin
1550 LDY #end-space
1560 JMP charol
1570 :
1580 .highl
1590 AND &7F
1600 BNE bold
1610 :
1620 .under
1630 LDX #ulon-origin
1640 LDA ulflag
1650 EOR #&FF
1660 STA ulflag
1670 BNE underl
1680 LDX #ulof-origin
1690 .underl
1700 LDY #ulof-ulon
1710 .under2
1720 JSR eprint
1730 JMP return
1740 :
1750 .bold
1760 LDX #bdon-origin
1770 LDA bdflag
1780 EOR #&FF
1790 STA bdflag
1800 BNE bold1
1810 LDX #bdof-origin
1820 .bold1
1830 LDY #bdof-bdon
1840 JMP under2
1850 ]
1860 NEXT
1870 ENDPROC
1880 :
1890 DEF PROCchecksum
1900 C=0
1910 FOR I%=code TO cod
e+&CB
1920 C=C+?(I%)
1930 NEXT I%
1940 IF C<>17277 THEN P
RINT "Check listing.":EN
D
1950 ENDPROC
1960 :
1970 DEF PROCsave
1980 PROCoscli("SAVE MI
CROSP "+STR$~code+" +100
40C 400")
1990 ENDPROC
2000 :
2010 DEF FNequb(b%)
2020 ?O%=b%
2030 P%=P%+1:O%=O%+1
2040 =pass
2050 :
2060 DEF FNequw(b%)
2070 ?O%=b% MOD 256
2080 O%?1=b% DIV 256
2090 P%=P%+2:O%=O%+2
2100 =pass
2110 :
2120 DEF FNequs(b$)
2130 $O%=b$
2140 P%=P%+LEN(b$):O%=O
%+LEN(b$)
2150 =pass
2160 :
2170 DEF PROCoscli(stri
ng$)
2180 DIM X% &FF
2190 Y%=X% DIV 256
2200 $X%=string$
2210 CALL &FFF7
2220 ENDPROC
```

Listing 2. Proportional justified text with 24-pin printers

```
10 REM Proportional s
pacing printer driver
20 REM by Graham Bell
30 REM for LQ printer
s
40 REM (C) Acorn User
September 1988
50 :
60 PROCvars
70 PROCclearmem
80 PROCassemble
90 PROCchecksum
100 PROCsave
110 END
120 :
130 DEF PROCvars
140 osbyte=&FFF4
150 oswrch=&FFEE
160 osasci=&FFE3
170 buffer=&0900
180 origin=&0400
190 sp=32
200 esc=27
210 cr=13
220 ENDPROC
230 :
240 DEF PROCclearmem
250 DIM code &FF
260 FOR I%=0 TO &FF
270 code?I%=0
280 NEXT
290 ENDPROC
300 :
310 DEF PROCassemble
320 FOR pass=4 TO 7 ST
EP 3
330 P%=origin
340 O%=code
350 [OPT pass
360 JMP charop
370 JMP on
380 JMP off
390 RTS
400 .bufptr
410 BRK
420 .lmflag
430 BRK
440 RTS
450 .tempa
460 BRK
470 .tempx
480 BRK
490 .tempy
500 BRK
510 :
520 .margin
530 OPT FNequb(esc)
540 OPT FNequs("@")
550 OPT FNequb(esc)
560 OPT FNequs("p")
570 OPT FNequb(1)
580 OPT FNequb(esc)
590 OPT FNequs("l")
600 .lm
610 OPT FNequb(0)
620 OPT FNequb(esc)
630 OPT FNequs("Q")
640 .rm
650 OPT FNequb(0)
660 OPT FNequb(esc)
670 OPT FNequs("a")
680 OPT FNequb(3)
690 OPT FNequb(cr)
700 .next
710 :
720 .eprint
730 LDA origin,X
740 JSR oswrch
750 INX
760 DEY
770 BNE eprint
780 RTS
790 :
800 .off
810 LDA #&03
820 LDX #&00
830 JMP osbyte
840 :
850 .on
860 LDA #&03
870 LDX #&0A
880 JMP osbyte
890 :
900 .charop
910 STA tempa
920 STX tempx
930 STY tempy
940 :
950 LDX lmflag
960 BEQ setlm
970 .store
980 LDX bufptr
990 INC bufptr
1000 STA buffer,X
1010 CMP #cr
1020 BEQ output
1030 .return
1040 LDA tempa
1050 LDX tempx
1060 LDY tempy
1070 RTS
1080 :
1090 .setlm
1100 CMP #sp
1110 BNE isset
1120 INC lm
1130 BNE return
1140 .isset
1150 INC lmflag
1160 BNE store
1170 :
1180 .output
1190 TXA
1200 CLC
1210 ADC lm
1220 TAX
1230 LSR A
1240 LSR A
1250 LSR A
1260 STA rm
1270 TXA
1280 SEC
1290 SBC rm
1300 STA rm
1310 LDX #margin-origin
1320 LDY #next-margin
1330 JSR eprint
1340 LDX #&00
1350 .loop
1360 LDA buffer,X
1370 JSR osasci
1380 INX
1390 CMP #cr
1400 BNE loop
1410 LDA #&00
1420 STA bufptr
1430 STA rm
1440 STA lm
1450 STA lmflag
1460 BEQ return
1470 :
1480 ]
1490 NEXT pass
1500 ENDPROC
1510 :
1520 DEF PROCchecksum
1530 C=0
1540 FOR I%=code TO cod
e+&A3
1550 C=C+?(I%)
1560 NEXT I%
1570 IF C<>14096 THEN P
RINT "Check listing.":EN
D
1580 ENDPROC
1590 :
1600 DEF PROCsave
1610 PROCoscli("SAVE PR
OPSP "+STR$~code+" +100
400 400")
1620 ENDPROC
1630 :
1640 DEF FNequb(b%)
1650 ?O%=b%
1660 P%=P%+1:O%=O%+1
1670 =pass
1680 :
1690 DEF FNequs(b$)
1700 $O%=b$
1710 P%=P%+LEN(b$):O%=O
%+LEN(b$)
1720 =pass
1730 :
1740 DEF PROCoscli(stri
ng$)
1750 DIM X% &FF
1760 Y%=X% DIV 256
1770 $X%=string$
1780 CALL &FFF7
1790 ENDPROC
```

See Go with the flow, page 56

Listing 1. Wimp based flowchart designer

```
   10 REM >Flow
   20 REM by Chris Adie
   30 REM for Archimedes only
   40 REM (c) Acorn User September 1988
   50 :
   60 MODE 12
   70 DIM block &200,pollb &20,filename 8,alertmessage 80
   80 ON ERROR PROCerror
   90 *FX 200,1
  100 *SLOAD flowicons
  110 PROCinitobtable
  120 PROCinitcolours
  130 PROCinitmenus
  140 SYS "Wimp_Initialise"
  150 PROCmouserectangle(0,0,1279,1023)
  160 :
  170 gridx%=40:gridy%=40
  180 claimdrag$="":claimdialog$=""
  190 dialog%=-1:alert%=-1
  200 :
  210 dmaxx%=2000:dmaxy%=2000
  220 drawwin%=FNcreatewindow("Flow Draw",&0F,black,white,dmaxy%,dmaxx%,100,250,500,750,0)
  230 PROCopenwindow(drawwin%,FALSE)
  240 :
  250 nx%=3:ny%=2
  260 nicons%=nx%*ny%
  270 DIM obname$(nicons%-1)
  280 ix%=32*2:iy%=12*4
  290 imaxx%=nx%*(ix%+4):imaxy%=ny%*(iy%+8)
  300 iconwin%=FNcreatewindow("Flow Icons",&93,black,white,imaxx%,imaxy%,300,300,300+imaxx%,300+imaxy%,0)
  310 PROCopenwindow(iconwin%,FALSE)
  320 obname$(0)="box"
  330 obname$(1)="rhombus"
  340 obname$(2)="circle"
  350 obname$(3)="triangle"
  360 obname$(4)="oval"
  370 obname$(5)="line"
  380 i%=0
  390 FOR y%=(ny%-1)*(iy%+8)+4 TO 4 STEP -(iy%+8)
  400 FOR x%=2 TO (nx%-1)*(ix%+4)+2 STEP (ix%+4)
  410 PROCcreateicon(iconwin%,x%,y%,x%+ix%,y%+iy%,white,black,&3022,obname$(i%))
  420 i%+=1
  430 NEXT x%
  440 NEXT y%
  450 selectedicon%=0
  460 PROCselecticon(iconwin%,selectedicon%)
  470 :
  480 REPEAT
  490 SYS "Wimp_Poll",0,pollb TO event%
  500 PROCaction(event%)
  510 UNTIL FALSE
  520 :
  530 DEF PROCaction(evnt%)
  540 LOCAL h%
  550 CASE evnt% OF
  560 WHEN 0:IF claimdrag$<>"" THEN junk=EVAL("FNdrag"+claimdrag$)
  570 WHEN 1:PROCredrawwindow(pollb!0)
  580 WHEN 2:PROCopenwindow(pollb!0,pollb)
  590 WHEN 3:PROCquit
  600 WHEN 4:
  610 WHEN 5:
  620 WHEN 6:PROCclickwindow
  630 WHEN 7:IF claimdrag$<>"" THEN junk=EVAL("FNuserdrag"+claimdrag$)
  640 WHEN 8:
  650 WHEN 9:IF claimmenu$<>"" THEN junk=EVAL("FNmenuselect"+claimmenu$)
  660 ENDCASE
  670 ENDPROC
  680 :
  690 DEF PROCopenwindow(handle%,newposition)
  700 LOCAL b
  710 IF newposition=FALSE THEN
  720 b=block:b!0=handle%
  730 SYS "Wimp_GetWindowState",0,b
  740 ELSE
  750 b=newposition
  760 ENDIF
  770 SYS "Wimp_OpenWindow",0,b
  780 ENDPROC
  790 :
  800 DEF PROCredrawwindow(handle%)
  810 LOCAL more%,ob,x0%,y0%,i%,name$,junk
  820 block!0=handle%
  830 SYS "Wimp_RedrawWindow",0,block TO more%
  840 PROCoriginlwa(block+4,x0%,y0%)
  850 WHILE more%
  860 block!28-=x0%:block!32-=y0%
  870 block!36-=x0%:block!40-=y0%
  880 ORIGIN x0%,y0%
  890 CASE handle% OF
  900 WHEN drawwin%:PROCredrawdrawwin(block+28)
  910 ENDCASE
  920 ORIGIN 0,0
  930 block!0=handle%
  940 SYS "Wimp_GetRectangle",0,block TO more%
  950 ENDWHILE
  960 ENDPROC
  970 :
  980 DEF PROCclosewindow(handle%)
  990 block!0=handle%
 1000 SYS "Wimp_CloseWindow",0,block
 1010 ENDPROC
 1020 :
 1030 DEF PROCclickwindow
 1040 LOCAL h%,b%
 1050 h%=pollb!12
 1060 b%=((pollb!8) AND 7) AND NOT ((pollb!20) AND 7)
 1070 mousex%=pollb!0:mousey%=pollb!4
 1080 CASE h% OF
 1090 WHEN iconwin%:PROCclickiconwin(b%,pollb!16)
 1100 WHEN drawwin%:PROCclickdrawwin(b%,pollb!16)
 1110 WHEN dialog%:PROCclickdialog(b%,pollb!16)
 1120 WHEN alert%:PROCclickalert(b%,pollb!16)
 1130 ENDIF
 1140 ENDCASE
 1150 ENDPROC
 1160 :
 1170 DEF FNcreatewindow(title$,flags%,fgcol%,bgcol%,maxX%,maxY%,waL%,waB%,waR%,waT%,nicons%)
 1180 LOCAL handle%
 1190 block!0 =waL%
 1200 block!4 =waB%
 1210 block!8 =waR%
 1220 block!12=waT%
 1230 block!16=0
 1240 block!20=maxY%
 1250 block!24=-1
 1260 block!28=flags%
 1270 block?32=titlefgcol
 1280 block?33=titlebgcol
 1290 block?34=fgcol%
 1300 block?35=bgcol%
 1310 block?36=scrollbarbgcol
 1320 block?37=scrollbarfgcol
 1330 block?38=highlightbgcol
 1340 block?39=0
 1350 block!40=0
 1360 block!44=0
 1370 block!48=maxX%
 1380 block!52=maxY%
 1390 block!56=&2D
 1400 block!60=&3000
 1410 block!64=0
 1420 block!68=0
 1430 $(block+72)=LEFT$(title$,11)
 1440 block!84=nicons%
 1450 SYS "Wimp_CreateWindow",0,block TO handle%
 1460 =handle%
 1470 :
 1480 DEF PROCerror
 1490 ON ERROR OFF
 1500 LOCAL err,erl,er$
 1510 err=ERR:erl=ERL:er$=REPORT$
 1520 SWI "Wimp_CloseDown"
```

Continued ►

◄ Go with the flow listing 1 continued

```
1530 MODE 12
1540 *FX 200,0
1550 PRINT "Error number ";err;" : ";er$;" a
t line ";erl
1560 END
1570 :
1580 DEF FNmin(a%,b%)
1590 IF a%>b% THEN =b% ELSE =a%
1600 :
1610 DEF FNmax(a%,b%)
1620 IF a%<b% THEN =b% ELSE =a%
1630 :
1640 DEF FNintersect(a,b)
1650 LOCAL tx1,ty1,tx2,ty2
1660 IF a!0>b!0 THEN tx1=a!0 ELSE tx1=b!0
1670 IF a!4>b!4 THEN ty1=a!4 ELSE ty1=b!4
1680 IF a!8>b!8 THEN tx2=b!8 ELSE tx2=a!8
1690 IF a!12>b!12 THEN ty2=b!12 ELSE ty2=a!1
2
1700 =(tx1<=tx2) AND (ty1<=ty2)
1710 :
1720 DEF PROCmouserectangle(x%,y%,x1%,y1%)
1730 MOUSE RECTANGLE x%,y%,x1%-x%,y1%-y%
1740 mouseminx%=x%:mouseminy%=y%
1750 mousemaxx%=x1%:mousemaxy%=y1%
1760 ENDPROC
1770 :
1780 DEF PROCselecticon(window%,icon%)
1790 block!0=window%:block!4=icon%
1800 block!8=red<<28:block!12=&F0000000
1810 SYS "Wimp_SetIconState",0,block
1820 ENDPROC
1830 :
1840 DEF PROCdeselecticon(window%,icon%)
1850 block!0=window%:block!4=icon%
1860 block!8=white<<28:block!12=&F0000000
1870 SYS "Wimp_SetIconState",0,block
1880 ENDPROC
1890 :
1900 DEF PROCinverticon(window%,icon%)
1910 block!0=window%:block!4=icon%
1920 block!8=&00200000:block!12=0
1930 SYS "Wimp_SetIconState",0,block
1940 ENDPROC
1950 :
1960 DEF PROCoriginwindowlwa(win%,RETURN x0%
, RETURN y0%)
1970 block!0=win%
1980 SYS "Wimp_GetWindowState",0,block
1990 PROCoriginlwa(block+4,x0%,y0%)
2000 ENDPROC
2010 :
2020 DEF PROCoriginlwa(b,RETURN x%,RETURN y%
)
2030 x%=b!0-b!16
2040 y%=b!12-b!20
2050 ENDPROC
2060 :
2070 DEF PROCsetcaret(r0%,r1%,r2%,r3%,r4%,r5
%)
2080 SYS "Wimp_SetCaretPosition",r0%,r1%,r2%
,r3%,r4%,r5%
2090 ENDPROC
2100 :
2110 DEF PROCcreateicon(window%,minx%,miny%,
maxx%,maxy%,bg%,fg%,flg%,data$)
2120 LOCAL i%
2130 block!0=window%
2140 block!4=minx%:block!8=miny%
2150 block!12=maxx%:block!16=maxy%
2160 block!20=flg% OR bg%<<28 OR fg%<<24
2170 IF block!20 AND &100 THEN
2180 i%=INSTR(data$,",")
2190 block!24=EVAL(LEFT$(data$,i%-1))
2200 block!28=-1
2210 block!32=EVAL(MID$(data$,i%+1))
2220 ELSE
2230 $(block+24)=LEFT$(data$,11)
2240 ENDIF
2250 SYS "Wimp_CreateIcon",0,block
2260 ENDPROC
2270 :
2280 DEF PROCcreatealert(message$)
2290 LOCAL n%,w%,h%,x%,y%,i%,minx%,miny%,max
x%,maxy%
2300 MOUSE x%,y%,junk
2310 h%=200:y%-=h%
2320 w%=200+FNmax(16*LEN(message$),200)
2330 alert%=FNcreatewindow("",&90,black,cyan
,w%,h%,x%,y%,x%+w%,y%+h%,0)
2340 PROCcreateicon(alert%,190,30,190+160,30
+40,lightgrey,black,&303D,"Continue")
2350 PROCcreateicon(alert%,20,30,100,100,cya
n,black,&02,"warning")
2360 $alertmessage=message$
2370 PROCcreateicon(alert%,180,100,180+16*LE
N($alertmessage),100+40,cyan,black,&0119,"ale
rtmessage,LEN($alertmessage)")
2380 PROCopenwindow(alert%,FALSE)
2390 oldmouseminx%=mouseminx%
2400 oldmouseminy%=mouseminy%
2410 oldmousemaxx%=mousemaxx%
2420 oldmousemaxy%=mousemaxy%
2430 PROCmouserectangle(block!4,block!8,bloc
k!12,block!16)
2440 ENDPROC
2450 :
2460 DEF PROCclickalert(button%,icon%)
2470 IF icon%<0 THEN ENDPROC
2480 PROCinverticon(alert%,icon%)
2490 PROCclosewindow(alert%)
2500 alert%=-1
2510 PROCmouserectangle(oldmouseminx%,oldmou
seminy%,oldmousemaxx%,oldmousemaxy%)
2520 ENDPROC
2530 :
2540 DEF PROCclickdrawwin(buttons%,icon%)
2550 IF buttons% AND 4 THEN PROCselectdrawwi
n
2560 IF buttons% AND 2 THEN PROCmenudrawwin
2570 IF buttons% AND 1 THEN PROCcreateob
2580 ENDPROC
2590 :
2600 DEF PROCmenudrawwin
2610 junk=FNcreatemenu(0,drawwinmenu$)
2620 claimmenu$="drawwin"
2630 ENDPROC
2640 :
2650 DEF FNmenuselectdrawwin
2660 CASE pollb!0 OF
2670 WHEN 0:PROCload
2680 WHEN 1:PROCsave
2690 WHEN 2:IF (pollb!4>=0) AND (pollb!4<=6)
THEN PROCselectcolour(pollb!4)
2700 WHEN 3:PROCdeleteob
2710 WHEN 4:PROCsettextob
2720 ENDCASE
2730 claimmenu$=""
2740 =0
2750 :
2760 DEF PROCselectdrawwin
2770 LOCAL i%,j%,b,old
2780 IF selectedobject%<>0 THEN b=selectedob
ject% ELSE b=obtable
2790 PROCdeselectob(selectedobject%)
2800 old=b
2810 REPEAT
2820 b+=obrecord : IF b>=obfree THEN b=obtab
le
2830 IF FNmousein(b) THEN selectedobject%=b
2840 UNTIL (selectedobject%<>0) OR (b=old)
2850 PROCselectob(selectedobject%)
2860 ENDPROC
2870 :
2880 DEF PROCredrawdrawwin(b)
2890 PROCgrid(b)
2900 ob=obtable
2910 WHILE ob<obfree
2920 IF FNintersect(b,ob+obminx) THEN PROCdr
awob(ob)
2930 ob+=obrecord
2940 ENDWHILE
2950 ENDPROC
2960 :
2970 DEF PROCgetmousedrawwin(RETURN x%,RETUR
N y%)
2980 LOCAL x0%,y0%
2990 MOUSE mousex%,mousey%,junk
3000 PROCoriginwindowlwa(drawwin%,x0%,y0%)
3010 x%=mousex%-x0%:y%=mousey%-y0%
```

Continued ►

◀ **Go with the flow listing 1 continued**

```
3020 x%=(x%+gridx% DIV 2) DIV gridx%:x%=x%*gridx%
3030 y%=(y%+gridy% DIV 2) DIV gridy%:y%=y%*gridy%
3040 ENDPROC
3050 :
3060 DEF PROCclickiconwin(button%,icon%)
3070 IF icon%<0 THEN ENDPROC
3080 PROCdeselecticon(iconwin%,selectedicon%)
3090 selectedicon%=icon%
3100 PROCselecticon(iconwin%,selectedicon%)
3110 ENDPROC
3120 :
3130 DEF FNcreatedialog
3140 LOCAL nicons%,width%,height%,x%,y%,i%,h%
3150 LOCAL minx%,miny%,maxx%,maxy%,bg%,fg%,flg%,i$
3160 MOUSE mousex%,mousey%,junk
3170 READ claimdialog$
3180 READ i$:nicons%=EVAL(i$)
3190 READ i$:width% =EVAL(i$)
3200 READ i$:height%=EVAL(i$)
3210 x%=mousex%
3220 y%=mousey%-height%
3230 h%=FNcreatewindow("",&90,black,white,width%,height%,x%,y%,x%+width%,y%+height%,0)
3240 FOR i%=1 TO nicons%
3250 READ i$:minx%=EVAL(i$)
3260 READ i$:miny%=EVAL(i$)
3270 READ i$:maxx%=EVAL(i$)
3280 READ i$:maxy%=EVAL(i$)
3290 READ i$:bg%  =EVAL(i$)
3300 READ i$:fg%  =EVAL(i$)
3310 READ i$:flg% =EVAL(i$)
3320 READ i$
3330 PROCcreateicon(h%,minx%,miny%,maxx%,maxy%,bg%,fg%,flg%,i$)
3340 NEXT i%
3350 PROCopenwindow(h%,FALSE)
3360 PROCmouserectangle(block!4,block!8,block!12,block!16)
3370 =h%
3380 :
3390 DEF PROCclickdialog(button%,icon%)
3400 IF claimdialog$="" THEN ENDPROC
3410 IF icon%=-1 THEN ENDPROC
3420 IF EVAL("FNclickdialog"+claimdialog$+"(icon%)") THEN
3430 PROCclosewindow(dialog%)
3440 PROCmouserectangle(0,0,1279,1023)
3450 claimdialog$=""
3460 ENDIF
3470 ENDPROC
3480 :
3490 DEF PROCdrawob(ob)
3500 LOCAL t$
3510 IF ob=selectedobject% THEN
3520 PROCsetflash(ob?obcolour)
3530 GCOL flash
3540 ELSE
3550 GCOL ob?obcolour
3560 ENDIF
3570 junk=EVAL("FNdrawob"+$(ob+obtype)+"(ob)")
3580 ENDPROC
3590 :
3600 DEF PROCcreateob
3610 LOCAL ob,x%,y%
3620 IF obfree>=obtable+obtablesize THEN PROCcreatealert("Not enough space!") : ENDPROC
3630 PROCgetmousedrawwin(x%,y%)
3640 ob=obfree
3650 $(ob+obtype)=obname$(selectedicon%)
3660 ob?obcolour=selectedcolour%
3670 $(ob+obtext)=""
3680 IF EVAL("FNcreateob"+$(ob+obtype)+"(ob,x%,y%)") THEN
3690 obfree+=obrecord
3700 SYS "Wimp_ForceRedraw",drawwin%,ob!obminx,ob!obminy,ob!obmaxx+1,ob!obmaxy+1
3710 ENDIF
3720 ENDPROC
3730 :
3740 DEF PROCselectob(ob)
3750 IF ob=0 THEN ENDPROC
3760 $mtext=$(ob+obtext)
3770 selectedobject%=ob
3780 SYS "Wimp_ForceRedraw",drawwin%,b!obminx,b!obminy,b!obmaxx+1,b!obmaxy+1
3790 PROCselectmenudelete
3800 PROCselectmenutext
3810 ENDPROC
3820 :
3830 DEF PROCdeselectob(b)
3840 SYS "Wimp_ForceRedraw",drawwin%,b!obminx,b!obminy,b!obmaxx+1,b!obmaxy+1
3850 $mtext=""
3860 selectedobject%=0
3870 PROCdeselectmenudelete
3880 PROCdeselectmenutext
3890 ENDPROC
3900 :
3910 DEF PROCsettextob
3920 IF selectedobject%=0 THEN ENDPROC
3930 $(selectedobject%+obtext)=$mtext
3940 PROCdeselectob(selectedobject%)
3950 ENDPROC
3960 :
3970 DEF FNtextlengthob(ob)
3980 =EVAL("FNtextlengthob"+$(ob+obtype))
3990 :
4000 DEF PROCdeleteob
4010 LOCAL b,i%
4020 IF selectedobject%=0 THEN ENDPROC
4030 b=selectedobject%
4040 PROCdeselectob(b)
4050 IF b+obrecord<obfree THEN
4060 FOR i%=b+obrecord TO obfree-4 STEP 4
4070 !(i%-obrecord)=!i%
4080 NEXT i%
4090 ENDIF
4100 obfree-=obrecord
4110 ENDPROC
4120 :
4130 DEF FNtextlengthobbox:=37
4140 :
4150 DEF FNdrawobbox(ob)
4160 LOCAL t$
4170 t$=$(ob+obtext)
4180 RECTANGLE ob!obminx,ob!obminy,ob!obx1,ob!oby1
4190 MOVE ob!obminx+24,ob!obminy+ob!oby1-20
4200 PRINT LEFT$(t$,12);:t$=MID$(t$,13)
4210 MOVE ob!obminx+24,ob!obminy+ob!oby1-60
4220 PRINT LEFT$(t$,12);:t$=MID$(t$,13)
4230 MOVE ob!obminx+24,ob!obminy+ob!oby1-100
4240 PRINT LEFT$(t$,12);
4250 =0
4260 :
4270 DEF FNcreateobbox(ob,x%,y%)
4280 ob!obx1=6*gridx%
4290 ob!oby1=4*gridy%
4300 ob!obminx=x%-ob!obx1 DIV 2
4310 ob!obminy=y%-ob!oby1
4320 ob!obmaxx=x%+ob!obx1 DIV 2
4330 ob!obmaxy=y%
4340 =TRUE
4350 :
4360 DEF FNdrawobrhombus(ob)
4370 LOCAL t$
4380 t$=$(ob+obtext)
4390 MOVE ob!obminx+ob!obx1,ob!obmaxy
4400 DRAW ob!obminx,ob!obminy+ob!oby1
4410 DRAW ob!obminx+ob!obx1,ob!obminy
4420 DRAW ob!obmaxx,ob!obminy+ob!oby1
4430 DRAW ob!obminx+ob!obx1,ob!obmaxy
4440 MOVE ob!obminx+96,ob!obmaxy-60
4450 PRINT LEFT$(t$,8);:t$=MID$(t$,9)
4460 MOVE ob!obminx+48,ob!obmaxy-108
4470 PRINT LEFT$(t$,14);:t$=MID$(t$,15)
4480 MOVE ob!obminx+96,ob!obmaxy-156
4490 PRINT LEFT$(t$,8);
4500 =0
4510 :
4520 DEF FNcreateobrhombus(ob,x%,y%)
4530 ob!obx1=4*gridx%
4540 ob!oby1=3*gridy%
4550 ob!obminx=x%-ob!obx1
4560 ob!obminy=y%-2*ob!oby1
4570 ob!obmaxx=x%+ob!obx1
4580 ob!obmaxy=y%
```

Continued ▶

YELLOW PAGES

ARCHIMEDES

◄ **Go with the flow listing 1 continued**

```
4590 =TRUE
4600 :
4610 DEF FNtextlengthobrhombus:=31
4620 :
4630 DEF FNdrawobcircle(ob)
4640 LOCAL t$
4650 t$=$(ob+obtext)
4660 CIRCLE ob!obminx+ob!obx1,ob!obminy+ob!o
bx1,ob!obx1
4670 MOVE ob!obminx+24,ob!obmaxy-60
4680 PRINT LEFT$(t$,12);:t$=MID$(t$,13)
4690 MOVE ob!obminx+24,ob!obmaxy-100
4700 PRINT LEFT$(t$,12);:t$=MID$(t$,13)
4710 MOVE ob!obminx+24,ob!obmaxy-140
4720 PRINT LEFT$(t$,12);
4730 =0
4740 :
4750 DEF FNcreateobcircle(ob,x%,y%)
4760 ob!obx1=3*gridy%
4770 ob!obminx=x%-ob!obx1
4780 ob!obminy=y%-ob!obx1
4790 ob!obmaxx=x%+ob!obx1
4800 ob!obmaxy=y%+ob!obx1
4810 =TRUE
4820 :
4830 DEF FNtextlengthobcircle:=37
4840 :
4850 DEF FNdrawobtriangle(ob)
4860 MOVE ob!obminx,ob!obmaxy
4870 DRAW ob!obminx+ob!obx1 DIV 2,ob!obminy
4880 DRAW ob!obmaxx,ob!obmaxy
4890 DRAW ob!obminx,ob!obmaxy
4900 MOVE BY 34,-12
4910 PRINT $(ob+obtext);
4920 =0
4930 :
4940 DEF FNcreateobtriangle(ob,x%,y%)
4950 ob!obx1=2*gridx%
4960 ob!obminx=x%-ob!obx1 DIV 2
4970 ob!obminy=y%-(ob!obx1 * 9) DIV 10
4980 ob!obmaxx=x%+ob!obx1 DIV 2
4990 ob!obmaxy=y%
5000 =TRUE
5010 :
5020 DEF FNtextlengthobtriangle:=2
5030 :
5040 DEF FNdrawoboval(ob)
5050 MOVE ob!obminx+ob!oby1 DIV 2,ob!obmaxy
5060 DRAW ob!obmaxx-ob!oby1 DIV 2,ob!obmaxy
5070 MOVE ob!obminx+ob!oby1 DIV 2,ob!obminy
5080 DRAW ob!obmaxx-ob!oby1 DIV 2,ob!obminy
5090 MOVE ob!obminx+ob!oby1 DIV 2,ob!obminy+
ob!oby1 DIV 2
5100 MOVE ob!obminx+ob!oby1 DIV 2,ob!obmaxy
5110 PLOT &A5,ob!obminx+ob!oby1 DIV 2,ob!obm
iny
5120 MOVE ob!obmaxx-ob!oby1 DIV 2,ob!obminy+
ob!oby1 DIV 2
5130 MOVE ob!obmaxx-ob!oby1 DIV 2,ob!obminy
5140 PLOT &A5,ob!obmaxx-ob!oby1 DIV 2,ob!obm
axy
5150 MOVE ob!obminx+ob!oby1 DIV 2-4,ob!obmax
y-8
5160 PRINT $(ob+obtext);
5170 =0
5180 :
5190 DEF FNcreateoboval(ob,x%,y%)
5200 ob!obx1=5*gridx%
5210 ob!oby1=1*gridy%
5220 ob!obminx=x%-ob!obx1 DIV 2
5230 ob!obminy=y%-ob!oby1
5240 ob!obmaxx=x%+ob!obx1 DIV 2
5250 ob!obmaxy=y%
5260 =TRUE
5270 :
5280 DEF FNtextlengthoboval:=12
5290 :
5300 DEF FNdrawobline(ob)
5310 MOVE ob!obx1,ob!oby1
5320 DRAW ob!obx2,ob!oby2
5330 =0
5340 :
5350 DEF FNcreateobline(ob,x%,y%)
5360 ob!obx1=x%
5370 ob!oby1=y%
5380 block!0=drawwin%
5390 SYS "Wimp_GetWindowState",0,block
5400 block!24=block!4
5410 block!28=block!8
5420 block!32=block!12
5430 block!36=block!16
5440 block!0=drawwin%
5450 block!4=7
5460 SYS "Wimp_DragBox",0,block
5470 dragx%=x%:dragy%=y%
5480 olddragx%=dragx%:olddragy%=dragy%
5490 claimdrag$="line"
5500 =FALSE
5510 :
5520 DEF FNtextlengthobline:=0
5530 :
5540 DEF FNdragline
5550 LOCAL x%,y%,x0%,y0%
5560 PROCoriginwindowlwa(drawwin%,x0%,y0%)
5570 PROCgetmousedrawwin(x%,y%)
5580 IF (olddragx%=x%) AND (olddragy%=y%) TH
EN =0
5590 ORIGIN x0%,y0%
5600 MOVE dragx%,dragy%:PLOT &16,olddragx%,o
lddragy%
5610 MOVE dragx%,dragy%:PLOT &16,x%,y%
5620 ORIGIN 0,0
5630 olddragx%=x%
5640 olddragy%=y%
5650 =0
5660 :
5670 DEF FNuserdragline
5680 LOCAL x%,y%,ob,x0%,y0%
5690 ob=obfree
5700 PROCoriginwindowlwa(drawwin%,x0%,y0%)
5710 PROCgetmousedrawwin(x%,y%)
5720 ORIGIN x0%,y0%
5730 MOVE dragx%,dragy%:PLOT &16,olddragx%,o
lddragy%
5740 ORIGIN 0,0
5750 ob!obx2=x%
5760 ob!oby2=y%
5770 ob!obminx=FNmin(ob!obx1,ob!obx2)
5780 ob!obminy=FNmin(ob!oby1,ob!oby2)
5790 ob!obmaxx=FNmax(ob!obx1,ob!obx2)
5800 ob!obmaxy=FNmax(ob!oby1,ob!oby2)
5810 claimdrag$=""
5820 IF (ob!obx1=ob!obx2) AND (ob!oby1=ob!ob
y2) THEN =0
5830 obfree+=obrecord
5840 SYS "Wimp_ForceRedraw",drawwin%,ob!obmi
nx,ob!obminy,ob!obmaxx+1,ob!obmaxy+1
5850 =0
5860 :
5870 DEF PROCselectcolour(j%)
5880 LOCAL i%,t$,b
5890 t$=colourmenu$
5900 i%=INSTR(t$,"#")
5910 WHILE j%>0
5920 t$=MID$(t$,i%+1):j%-=1:i%=INSTR(t$,"#")
5930 ENDWHILE
5940 c%=EVAL("&"+MID$(t$,i%+1,1))
5950 selectedcolour%=c%
5960 i%=INSTR(colourmenu$,">")
5970 IF i%>0 THEN colourmenu$=LEFT$(colourme
nu$,i%-1)+MID$(colourmenu$,i%+1)
5980 i%=INSTR(colourmenu$,"#"+STR$~(c%))
5990 colourmenu$=LEFT$(colourmenu$,i%-1)+">"
+MID$(colourmenu$,i%)
6000 IF selectedobject%<>0 THEN
6010 b=selectedobject%
6020 SYS "Wimp_ForceRedraw",drawwin%,b!obmin
x,b!obminy,b!obmaxx+1,b!obmaxy+1
6030 b?obcolour=selectedcolour%
6040 ENDIF
6050 ENDPROC
6060 :
6070 DEF PROCinitcolours
6080 white=0:red=1:lightgrey=2:yellow=3
6090 blue=4:magenta=5:cyan=6:black=7
6100 flash=8:green=11:titlefgcol=12
6110 scrollbarbgcol=13:scrollbarfgcol=14
6120 midgrey=15:highlightbgcol=red
6130 titlebgcol=scrollbarfgcol
6140 COLOUR white,&F0,&F0,&F0
6150 COLOUR red,&F0,0,0
6160 COLOUR lightgrey,&A0,&A0,&A0
```

Continued ►

◀ Go with the flow listing 1 continued

```
6170 COLOUR black,0,0,0
6180 VDU 19,flash,17,&F0,&F0,&F0
6190 COLOUR green,0,&F0,0
6200 COLOUR titlefgcol,0,0,&80
6210 COLOUR scrollbarbgcol,0,&C0,&F0
6220 COLOUR scrollbarfgcol,&F0,&B0,&60
6230 COLOUR midgrey,&80,&80,&80
6240 VDU 19,0,24,&80,&80,&80
6250 *FX 9,10
6260 *FX 10,10
6270 ENDPROC
6280 :
6290 DEF PROCsetflash(c%)
6300 SYS "OS_ReadPalette",c%,16 TO ,,!block
6310 VDU 19,flash,18,block?1,block?2,block?3
6320 ENDPROC
6330 :
6340 DEF PROCquit
6350 REM   owner nicons   width  height
6360 DATA "quit","    4", " 420", " 150"
6370 REM    minx  miny  maxx  maxy     backgn
d foregnd   flags   data
6380 DATA "140"," 40","260"," 80","lightgrey
","black","&303D","Quit"
6390 DATA "280"," 40","400"," 80","lightgrey
","black","&303D","Cancel"
6400 DATA "120","100","420","140",     "white
","black","  &19","Quit flow?"
6410 DATA " 10"," 16","110","140",     "white
","black","  &02","stop"
6420 RESTORE 6360
6430 dialog%=FNcreatedialog
6440 ENDPROC
6450 :
6460 DEF FNclickdialogquit(icon%)
6470 PROCinverticon(dialog%,icon%)
6480 IF icon%=0 THEN
6490 PROCclosewindow(dialog%)
6500 PROCclosewindow(drawwin%)
6510 PROCclosewindow(iconwin%)
6520 SYS "Wimp_CloseDown"
6530 *FX 200,0
6540 *FX 9,25
6550 *FX 10,25
6560 MODE 12
6570 END
6580 ENDIF
6590 =TRUE
6600 :
6610 DEF PROCload
6620 $filename=""
6630 REM   owner nicons  width  height
6640 DATA "load","    5", " 300", " 250"
6650 REM    minx  miny  maxx  maxy     backgn
d foregnd   flags   data
6660 DATA " 20"," 50","140"," 90","lightgrey
","black","&303D","Load"
6670 DATA "160"," 50","280"," 90","lightgrey
","black","&303D","Cancel"
6680 DATA "  0","200","300","240",     "white
","black","  &19","Load file"
6690 DATA " 30","130","130","170",     "white
","black","  &19","Name:"
6700 DATA "140","130","270","170",     "white
","black","&F11D","filename,8"
6710 RESTORE 6640
6720 dialog%=FNcreatedialog
6730 PROCsetcaret(dialog%,4,0,0,-1,0)
6740 ENDPROC
6750 :
6760 DEF FNclickdialogload(icon%)
6770 LOCAL len%,filetype%,type%
6780 PROCinverticon(dialog%,icon%)
6790 IF icon%=0 THEN
6800 IF $filename="" THEN
6810 PROCcreatealert("Must specify a file na
me!")
6820 PROCinverticon(dialog%,icon%)
6830 =FALSE
6840 ENDIF
6850 SYS "OS_File",5,$filename TO type%,,fil
etype%,,len%
6860 IF (type%<>1) OR ((filetype% AND &FFFFF
F00)<>(&FFF00000 OR &OCA<<8)) THEN
6870 PROCcreatealert("File is of the wrong t
ype!")
6880 PROCinverticon(dialog%,icon%)
6890 =FALSE
6900 ENDIF
6910 OSCLI "LOAD "+$filename+" "+STR$~(obtab
le)
6920 obfree=obtable+(len% DIV obrecord)*obre
cord
6930 SYS "Wimp_ForceRedraw",drawwin%,0,0,dma
xx%,dmaxy%
6940 ENDIF
6950 =TRUE
6960 :
6970 DEF PROCsave
6980 $filename=""
6990 REM   owner nicons   width  height
7000 DATA "save","    5", " 300", " 250"
7010 REM    minx  miny  maxx  maxy     backgn
d foregnd   flags   data
7020 DATA " 20"," 50","140"," 90","lightgrey
","black","&303D","Save"
7030 DATA "160"," 50","280"," 90","lightgrey
","black","&303D","Cancel"
7040 DATA "  0","200","300","240",     "white
","black","  &19","Save file"
7050 DATA " 30","130","130","170",     "white
","black","  &19","Name:"
7060 DATA "140","130","270","170",     "white
","black","&F11D","filename,8"
7070 RESTORE 7000
7080 dialog%=FNcreatedialog
7090 PROCsetcaret(dialog%,4,0,0,-1,0)
7100 ENDPROC
7110 :
7120 DEF FNclickdialogsave(icon%)
7130 PROCinverticon(dialog%,icon%)
7140 IF icon%=0 THEN
7150 IF $filename="" THEN
7160 PROCcreatealert("Must specify a file na
me!")
7170 PROCinverticon(dialog%,icon%)
7180 =FALSE
7190 ENDIF
7200 OSCLI "SAVE "+$filename+" "+STR$~(obtab
le)+" "+STR$~(obfree)
7210 OSCLI "SETTYPE "+$filename+" OCA"
7220 ENDIF
7230 =TRUE
7240 :
7250 DEF PROCdeselectmenudelete
7260 LOCAL i%
7270 i%=INSTR(drawwinmenu$,"Delete")
7280 IF MID$(drawwinmenu$,i%-1,1)<>"<" THEN
drawwinmenu$=LEFT$(drawwinmenu$,i%-1)+"<"+MID
$(drawwinmenu$,i%)
7290 ENDPROC
7300 :
7310 DEF PROCdeselectmenutext
7320 LOCAL i%
7330 i%=INSTR(drawwinmenu$,"'text")
7340 IF MID$(drawwinmenu$,i%-1,1)<>"<" THEN
drawwinmenu$=LEFT$(drawwinmenu$,i%-1)+"<"+MID
$(drawwinmenu$,i%)
7350 ENDPROC
7360 :
7370 DEF PROCselectmenudelete
7380 LOCAL i%
7390 i%=INSTR(drawwinmenu$,"<Delete")
7400 IF i%>0 THEN drawwinmenu$=LEFT$(drawwin
menu$,i%-1)+MID$(drawwinmenu$,i%+1)
7410 ENDPROC
7420 :
7430 DEF PROCselectmenutext
7440 LOCAL i%
7450 textlength=FNtextlengthob(selectedobjec
t%)
7460 IF textlength<>0 THEN
7470 i%=INSTR(drawwinmenu$,"<'text")
7480 IF i%>0 THEN drawwinmenu$=LEFT$(drawwin
menu$,i%-1)+MID$(drawwinmenu$,i%+1)
7490 ENDIF
7500 ENDPROC
7510 :
7520 DEF PROCinitmenus
7530 maxtextlength=40
7540 textlength=maxtextlength
7550 DIM mtext maxtextlength
7560 $mtext=""
```

Continued ▶

◀ **Go with the flow listing 1 continued**

```
7570 menublocksize=28+10*24:noofmenus=3
7580 DIM menublock noofmenus*menublocksize
7590 colourmenu$="Colours"
7600 colourmenu$+="|#"+STR$~(black)+"Black"
7610 colourmenu$+="|#"+STR$~(red)+"Red"
7620 colourmenu$+="|#"+STR$~(green)+"Green"
7630 colourmenu$+="|#"+STR$~(yellow)+"Yellow
"
7640 colourmenu$+="|#"+STR$~(blue)+"Blue"
7650 colourmenu$+="|#"+STR$~(magenta)+"Magen
ta"
7660 colourmenu$+="|#"+STR$~(cyan)+"Cyan"
7670 PROCselectcolour(0)
7680 drawwinmenu$="Flow menu|Load...|:Save..
.|'colourmenu$'Colour|Delete|'textmenu$'Text"
7690 textmenu$="Object text|*mtext,textlengt
h"
7700 PROCdeselectmenutext
7710 PROCdeselectmenudelete
7720 ENDPROC
7730 :
7740 DEF FNcreatemenu(level%,text$)
7750 LOCAL newtext$,title$,ptr%,shade%,tick%
,dotted%,fgcol%,submenu%,writable%
7760 IF level%=0 THEN mb=menublock ELSE mb+=
menublocksize
7770 title$=LEFT$(text$,INSTR(text$,"|")-1)
7780 text$=MID$(text$,INSTR(text$,"|")+1)
7790 $mb=LEFT$(title$,11)
7800 mb?12=titlefgcol:mb?13=titlebgcol
7810 mb?14=black:mb?15=white
7820 mb!16=100+32:mb!20=32+8:mb!24=10
7830 IF RIGHT$(text$,1)<>"|" text$+="|"
7840 ptr%=mb+28
7850 REPEAT
7860 shade%=0:tick%=0:dotted%=0:writable%=0
7870 fgcol%=black:submenu%=-1
7880 IF LEFT$(text$,1)="<" THEN shade%=&4000
00: text$=MID$(text$,2)
7890 IF LEFT$(text$,1)=">" THEN tick%=1:text
$=MID$(text$,2)
7900 IF LEFT$(text$,1)=":" THEN dotted%=2:te
xt$=MID$(text$,2)
7910 IF LEFT$(text$,1)="*" THEN writable%=4:
text$=MID$(text$,2)
7920 IF LEFT$(text$,1)="#" THEN fgcol%=EVAL(
"&"+MID$(text$,2,1)):text$=MID$(text$,3)
7930 IF LEFT$(text$,1)="'" THEN
7940 text$=MID$(text$,2)
7950 newtext$=EVAL(LEFT$(text$,INSTR(text$,"
'")-1))
7960 text$=MID$(text$,INSTR(text$,"'")+1)
7970 submenu%=FNcreatemenu(level%+1,newtext$
)
7980 ENDIF
7990 IF writable% THEN
8000 i%=INSTR(text$,",")
8010 ptr%!12=EVAL(LEFT$(text$,i%-1))
8020 text$=MID$(text$,i%+1)
8030 ptr%!16=-1:ptr%!20=EVAL(LEFT$(text$,INS
TR(text$,"|")))
8040 mb!16=FNmax(mb!16,4+16*ptr%!20)
8050 ELSE
8060 $(ptr%+12)=LEFT$(LEFT$(text$,INSTR(text
$,"|")-1),11)
8070 ENDIF
8080 text$=MID$(text$,INSTR(text$,"|")+1)
8090 ptr%!0=tick% OR dotted% OR writable% OR
(&80 AND (text$=""))
8100 ptr%!4=submenu%
8110 ptr%!8=shade% OR writable%<<6 OR &01002
1 OR white<<28 OR fgcol%<<24
8120 ptr%+=24
8130 UNTIL text$=""
8140 IF level%=0 THEN SYS "Wimp_CreateMenu",
0,menublock,mousex%,mousey%
8150 =mb
8160 :
8170 DEF PROCinitobtable
8180 LOCAL n%,i%
8190 i%=0
8200 obtype    =i% : i%+=12
8210 obcolour=i% : i%+=4
8220 obminx    =i% : i%+=4
8230 obminy    =i% : i%+=4
8240 obmaxx    =i% : i%+=4
8250 obmaxy    =i% : i%+=4
8260 obx1      =i% : i%+=4
8270 oby1      =i% : i%+=4
8280 obx2      =i% : i%+=4
8290 oby2      =i% : i%+=4
8300 obtext    =i% : i%+=40
8310 obrecord=i%
8320 n%=50:obtablesize=n%*obrecord
8330 DIM obtable obtablesize
8340 obfree=obtable:selectedobject%=0
8350 ENDPROC
8360 :
8370 DEF PROCgrid(b)
8380 LOCAL x1,y1,x2,y2,i,j
8390 x1=(b!0 DIV gridx%) * gridx%
8400 y1=(b!4 DIV gridy%) * gridy%
8410 x2=(b!8 DIV gridx%) * gridx%
8420 y2=(b!12 DIV gridy%) * gridy%
8430 GCOL lightgrey
8440 FOR i=x1 TO x2 STEP gridx%
8450 FOR j=y1 TO y2 STEP gridy%
8460 POINT i,j
8470 NEXT j
8480 NEXT i
8490 ENDPROC
8500 :
8510 DEF FNmousein(ob)
8520 LOCAL x%,y%
8530 block!0=drawwin%
8540 SYS "Wimp_GetWindowState",0,block
8550 PROCoriginlwa(block+4,x%,y%)
8560 x%=mousex%-x%:y%=mousey%-y%
8570 = (ob!obminx<=x%) AND (x%<=ob!obmaxx) A
ND (ob!obminy<=y%) AND (y%<=ob!obmaxy)
```

Listing 2. Icon file generator

```
10 REM >MakeIcons
20 REM by Chris Adie
30 REM for Archimedes only
40 REM (c) Acorn User September 1988
50 REM * DO NOT RENUMBER *
60 :
70 MODE 0:OFF
80 DIM mem &2000
90 addr=0:line=400
100 REPEAT
110 PRINT ;CHR$13;"Data line ";line;" ";
120 sum=0:READ data$
130 REPEAT
140 byte=-1
150 IF LEFT$(data$,1)="X" byte=0
160 IF LEFT$(data$,1)="Z" byte=255
170 IF byte<>-1 THEN
180 end=INSTR(data$,"/")
190 num=EVAL("&"+MID$(data$,2,end-2))
200 FOR loop=addr TO addr+num-1
210 loop?mem=byte:sum+=byte
220 NEXT
230 data$=MID$(data$,end+1)
240 addr=loop
250 ELSE
260 addr?mem=EVAL("&"+LEFT$(data$,2))
270 sum+=addr?mem:addr+=1
280 data$=MID$(data$,3)
290 ENDIF
300 UNTIL data$=""
310 READ sum$
320 IF sum<>EVAL("&"+sum$) PRINT "wrong.":E
ND ELSE PRINT"OK.";
330 line+=10
340 UNTIL addr=&194C
350 save$="Save FlowIcons "+STR$~mem+"+"+ST
R$~addr+" 0 0"
360 PRINT'save$:OSCLI(save$)
370 *SetType FlowIcons FF9
380 END
390 :
400 DATA 08X3/10X3/5019X2/6C0BX2/77,16F
```

Continued ▶

◀ **Go with the flow listing 2 continued**

```
410 DATA 61726E696E67X5/09X3/23X3/04,2AF
420 DATA X3/03X3/2CX3/CC05X2/0CX3/0F,11B
430 DATA X3B/111111X24/1011111101X23/,77
440 DATA 1111X1/1111X22/101101X1/10,76
450 DATA 1101X21/1111X3/1111X20/1011,77
460 DATA 01X3/101101X1F/1111X5/1111,67
470 DATA X1E/101101X5/101101X1D/1111,66
480 DATA X7/1111X1C/101101X7/101101,66
490 DATA X1B/1111X4/77X4/1111X1A/10,CB
500 DATA 1101X3/777777X3/101101X19/,199
510 DATA 1111X3/7077777707X3/1111X18/,220
520 DATA 101101X3/7077777707X3/1011,21F
530 DATA 01X17/1111X4/7077777707X4/,1FF
540 DATA 1111X16/101101X4/7077777707,220
550 DATA X4/101101X15/1111X5/707777,1A2
560 DATA 7707X5/1111X14/101101X5/70,132
570 DATA 77777707X5/101101X13/1111X6/,1B0
580 DATA 7077777707X6/1111X12/101101,220
590 DATA X6/7077777707X6/101101X11/,1FE
600 DATA 1111X8/777777X8/1111X10/10,1B9
610 DATA 1101X8/777777X8/101101XF/11,1AA
620 DATA 11X9/707707X9/1111XE/101101,143
630 DATA X9/707707X9/101101XD/1111XB/,132
640 DATA 77XB/1111XC/101101XB/77XB/,132
650 DATA 101101XB/1111XC/77XC/1111XA/,DD
660 DATA 101101X19/101101X9/1111XC/,66
670 DATA 707707XC/1111X8/101101XC/77,1A9
680 DATA 7777XC/101101X7/1111XD/7077,219
690 DATA 07XD/1111X6/101101X1D/1011,6C
700 DATA 01X5/1111X1F/1111X4/101111,77
710 DATA 11111111111111111111111111,DD
720 DATA 11111111111111111111111111,DD
730 DATA 11111111111111101X3/1011111,BB
740 DATA 11111111111111111111111111,DD
750 DATA 11111111111111111111111111,DD
760 DATA 11111111111101X3/0FX23/F0Z3/,463
770 DATA 0FX10/Z3/X10/F0Z3/0FXF/F0Z3/,AF5
780 DATA 0FXF/F0Z3/0FXF/Z5/XF/F0Z3/,CF3
790 DATA 0FXE/F0Z5/0FXE/F0Z3/0FXE/Z7/,10FE
800 DATA XE/F0Z3/0FXD/F0Z7/0FXD/F0Z3/,FE1
810 DATA 0FXD/Z9/XD/F0Z3/0FXC/F0Z9/,16E9
820 DATA 0FXC/F0Z3/0FXC/ZB/XC/F0Z3/,12ED
830 DATA 0FXB/F0ZB/0FXB/F0Z3/0FXB/ZD/,1CF2
840 DATA XB/F0Z3/0FXA/F0ZD/0FXA/F0Z3/,15DB
850 DATA 0FXA/ZF/XA/F0Z3/0FX9/F0ZF/,22DD
860 DATA 0FX9/F0Z3/0FX9/Z11/X9/F0Z3/,18E7
870 DATA 0FX8/F0Z11/0FX8/F0Z3/0FX8/,15F9
880 DATA Z13/X8/F0Z3/0FX7/F0Z13/0FX7/,2AD5
890 DATA F0Z3/0FX7/Z15/X7/F0Z3/0FX6/,1CE3
900 DATA F0Z15/0FX6/F0Z3/0FX6/Z17/X6/,30CF
910 DATA F0Z3/0FX5/F0Z17/0FX5/F0Z3/,1FD1
920 DATA 0FX5/Z19/X5/F0Z3/0FX4/F0Z19/,36C9
930 DATA 0FX4/F0Z3/0FX4/Z1B/X4/F0Z3/,22DD
940 DATA 0FX3/F0Z1B/0FX3/F0Z3/0FX3/,1FEF
950 DATA Z1D/X3/F0Z3/0FX2/F0Z1D/0FX2/,3EC1
960 DATA F0Z3/0FX2/Z1F/X2/F0Z3/0FX1/,26D9
970 DATA F0Z1F/0FX1/F0Z3/0FX1/Z21/X1/,44BB
980 DATA F0Z3/0FF0Z21/0FF0Z3/0FZ23/,4CB3
990 DATA F0Z53/CC03X2/73746F70X8/07,5639
1000 DATA X3/1CX3/04X3/03X3/2CX3/2CX3/,7B
1010 DATA 0CX3/0FX5/10111111111111111,A2
1020 DATA 1111111111111111101XE/101111,BB
1030 DATA 11111111111111111111111111,DD
1040 DATA 111101XC/101111XF/111101XA/,78
1050 DATA 101111X11/111101X8/101111X13/,87
1060 DATA 111101X6/101111X15/111101X4/,78
1070 DATA 101111X17/111101X3/101101X17/,77
1080 DATA 101101X3/10111111111111111,BA
1090 DATA 11111111111111111111111111,DD
1100 DATA 11111111111101X3/101101X17/,89
1110 DATA 101101X3/101101X17/101101X3/,66
1120 DATA 101101X5/7777X1/70777707X1/,275
1130 DATA 7777X1/707777X4/101101X3/10,27E
1140 DATA 1101X4/70077007X1/7007X1/70,1E7
1150 DATA 07700770077007X3/101101X3/,18E
1160 DATA 101101X4/7007X3/7007X1/7007,187
1170 DATA 700770077007X3/101101X3/10,197
1180 DATA 1101X5/7777X2/7007X1/700770,25E
1190 DATA 07707777X4/101101X3/101101,1A9
1200 DATA X6/7007X1/7007X1/7007700770,24C
1210 DATA 07X5/101101X3/101101X4/7007,C2
1220 DATA 7007X1/7007X1/700770077007,253
1230 DATA X5/101101X3/101101X5/7777X2/,132
1240 DATA 7007X2/7777X1/7007X5/101101,1FE
```

Continued ▶

◀ **Go with the flow listing 2 continued**

```
1250 DATA X3/101101X17/101101X3/1011,65
1260 DATA 01X17/101101X3/101111111111,88
1270 DATA 11111111111111111111111111,DD
1280 DATA 111111111111111111101X3/1011,BB
1290 DATA 01X17/101101X3/101111X17/11,66
1300 DATA 1101X4/101111X15/111101X6/,67
1310 DATA 101111X13/111101X8/101111X11/,87
1320 DATA 111101XA/101111XF/111101XC/,78
1330 DATA 10111111111111111111111111,DC
1340 DATA 1111111111101XE/10111111111,BB
1350 DATA 111111111111111111111101X9/AC,157
1360 DATA 01X2/626F78X9/03X3/0BX7/1F,177
1370 DATA X3/2CX3/ECX3/0CX26/4444444,234
1380 DATA 4444444444444X6/04X8/40X6/04,1E0
1390 DATA X8/40X6/04X8/40X6/04X8/40X6/,CB
1400 DATA 04X8/40X6/04X8/40X6/444444,154
1410 DATA 444444444444444X46/ZA/X6/0F,BE1
1420 DATA X8/F0X6/0FX8/F0X6/0FX8/F0X6/,2EE
1430 DATA 0FX8/F0X6/0FX8/F0X6/0FX8/F0,2FD
1440 DATA X6/ZA/X23/AC01X2/636972636C,CB0
1450 DATA 65X6/03X3/0BX7/1FX3/2CX3/EC,1AA
1460 DATA X3/0CX19/44444444404X9/4044,1A4
1470 DATA X4/4044X7/4044X6/4044X6/44,1D0
1480 DATA X8/4004X4/4004X9/44X4/40XA/,10C
1490 DATA 40X4/4004X9/44X5/44X8/4004,150
1500 DATA X5/4044X6/4044X7/4044X4/40,1CC
1510 DATA 44XA/44444444404X1B/Z4/0FX9/,563
1520 DATA F0Z1/X4/F0Z1/X7/F0Z1/X6/F0,6BD
1530 DATA Z1/X6/Z1/X8/F00FX4/F00FX9/,3FC
1540 DATA Z1/X4/F0XA/F0X4/F00FX9/Z1/,4DD
1550 DATA X5/Z1/X8/F00FX5/F0Z1/X6/F0,4DD
1560 DATA Z1/X7/F0Z1/X4/F0Z1/XA/Z4/0F,8E8
1570 DATA X5/AC01X2/72686F6D627573X5/,3AD
1580 DATA 03X3/0BX7/1FX3/2CX3/ECX3/0C,151
1590 DATA X1A/4004XD/40044004XB/4004,110
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1610 DATA 04X6/4004X7/4004X4/4004X9/,D0
1620 DATA 4004X2/4004XB/40044004XD/40,150
1630 DATA 04X3E/F00FXD/F00FF00FXB/F0,3F1
1640 DATA 0FX2/F00FX9/F00FX4/F00FX7/,30C
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1660 DATA F00FX2/F00FXB/F00FF00FXD/F0,4EC
1670 DATA 0FX27/AC01X2/6F76616CX8/03,271
1680 DATA X3/0BX7/1FX3/2CX3/ECX3/0CX36/,14E
1690 DATA 4444444444444444444404X4/44,2F0
1700 DATA XA/4004X2/40XC/40X2/40XC/40,144
1710 DATA X3/44XA/4004X4/444444444444,220
1720 DATA 444444404X65/ZA/0FX4/Z1/XA/,C18
1730 DATA F00FX2/F0XC/F0X2/F0XC/F0X3/,4BF
1740 DATA Z1/XA/F00FX4/ZA/0FX32/AC01,CB0
1750 DATA X2/747269616E676C65X4/03X3/,359
1760 DATA 0BX7/1FX3/2CX3/ECX3/0CX27/,14E
1770 DATA 404444444444444X9/04X5/04,224
1780 DATA X9/40X4/40XB/04X3/04XB/40X2/,CB
1790 DATA 40XD/04X1/04XD/4040XF/04X4B/,CC
1800 DATA F0Z7/X9/0FX5/0FX9/F0X4/F0XB/,9E7
1810 DATA 0FX3/0FXB/F0X2/F0XD/0FX1/0F,21C
1820 DATA XD/F0F0XF/0FX27/AC01X2/6C69,371
1830 DATA 6E65X8/03X3/0BX7/1FX3/2CX3/,12C
1840 DATA ECX3/0CX15/4044XF/4044XF/40,240
1850 DATA 44XF/4044XF/4044XF/4044XF/,1D0
1860 DATA 4044XF/4044XF/4044X36/F0Z1/,37B
1870 DATA XF/F0Z1/XF/F0Z1/XF/F0Z1/XF/,5CD
1880 DATA F0Z1/XF/F0Z1/XF/F0Z1/XF/F0,6BD
1890 DATA Z1/XF/F0Z1/X24/,2EE
```

The easiest way to enter the listings is to buy the monthly listings disc or cassette. The disc is fully menu-driven and an excellent buy at only £5.95. The cassette version for the BBC micro and Electron contains a tape to disc transfer program and costs £3.95. The programs are also available on 3.5-inch disc for the Arc, Compact and Electron at £6.95 (see page 102)

The listings can also be downloaded from Micronet subscription (page 600 600 890A). The Acorn User *software can be downloaded just like any other programs from Prestel. Go to the first page by entering *AU#. Then the operation is fully prompted. The charge for the software from Micronet is £5.00.*

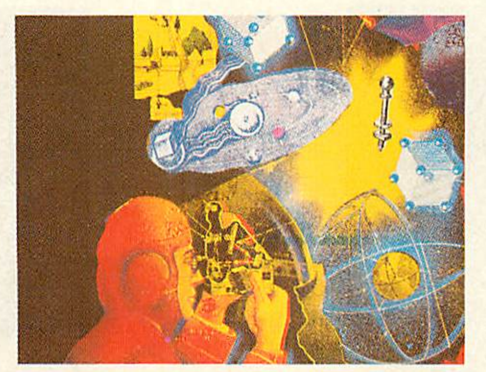
OFFERS

THIS MONTH'S LISTINGS

Continue to roam around the galaxy with the second half of *Warlord*, *Acorn User*'s epic adventure game. Part one was on the August disc, see page 101 to order.

View user's will find our microspacing printer driver program a real bonus. This program ensures that all word spaces are equal, giving an extra professional look to all your *View* documents.

David Atherton helps those who have had problems using ADFS. He also shows



how to delete whole directories from your discs or network at a single stroke. There is also a Volume Control ROM enabling you to control sound output.

For Arc owners there is our Flowchart program as well as all the routines from Arc Agora.

The September listings come on 5.25-inch 40/80-track disc for £5.95, as well as on 3.5-inch disc for Archimedes and Compact owners at £6.95.

Warlord — Part two – epic space adventure

DISCS AND BINDERS

For the first time owners of an Archimedes or Compact can guarantee the priority delivery of their 3.5-inch listings discs for only £55 a year. Those of you with 5.25-inch disc drives can still take advantage of our special £40 subscription offer. If you buy both *Acorn User* magazine and the *Acorn User* 5.25-inch monthly discs then you can save an additional £7.50 by subscribing to both for a mere £50.

Keep your copies of *Acorn User* in mint condition with our smart red binder. The binder features a wide spine to hold 12 issues of 200 pages. Only £4.95 ensures that misplaced and dog-earred copies are a thing of the past.

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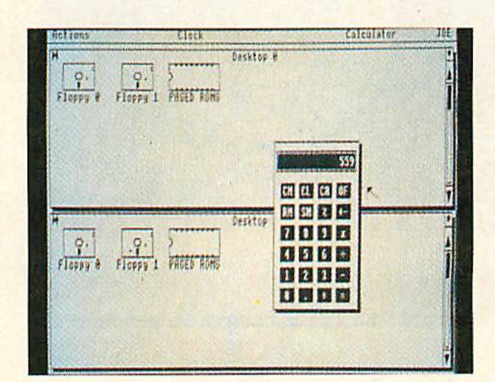


'87 COMPILATION DISC

Acorn User have put all your favourite programs, routines and utilities from 1987 on one disc.

Featured are: Kiddie Art; Tapestry; PCB by CAD; Autumn and Theme, our music programs from April '87. Also on the disc is Joe Telford's GEM-like front end for the Master including a desktop calendar and year planner.

Other useful utilities include a proportional screen dump, a *View* printer



driver generator, a monitor testing routine and a routine for printing spreadsheets sideways.

The second half of the disc is devoted to graphics, with a video image enhancer and six of the best Graphics Bonuses.

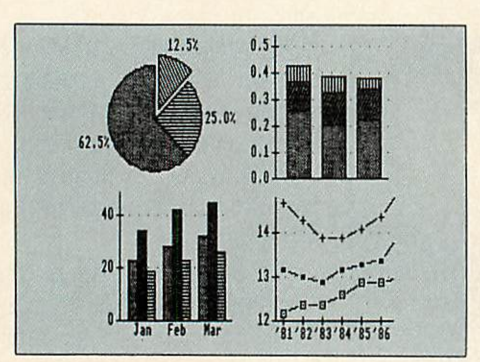
The *Acorn User* '87 Compilation disc comes in 5.25-inch 80-track format, with a comprehensive manual which includes all function key strips and instructions needed for the programs.

All the very best of '87 on one disc

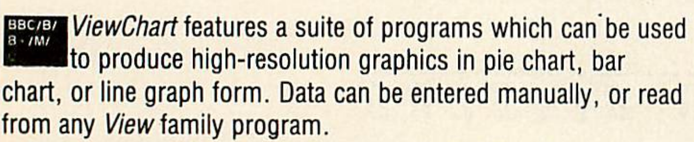
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OFFERS

ALL SORTS OF GRAPHICS



Figures in pictures


ViewChart features a suite of programs which can be used to produce high-resolution graphics in pie chart, bar chart, or line graph form. Data can be entered manually, or read from any *View* family program.

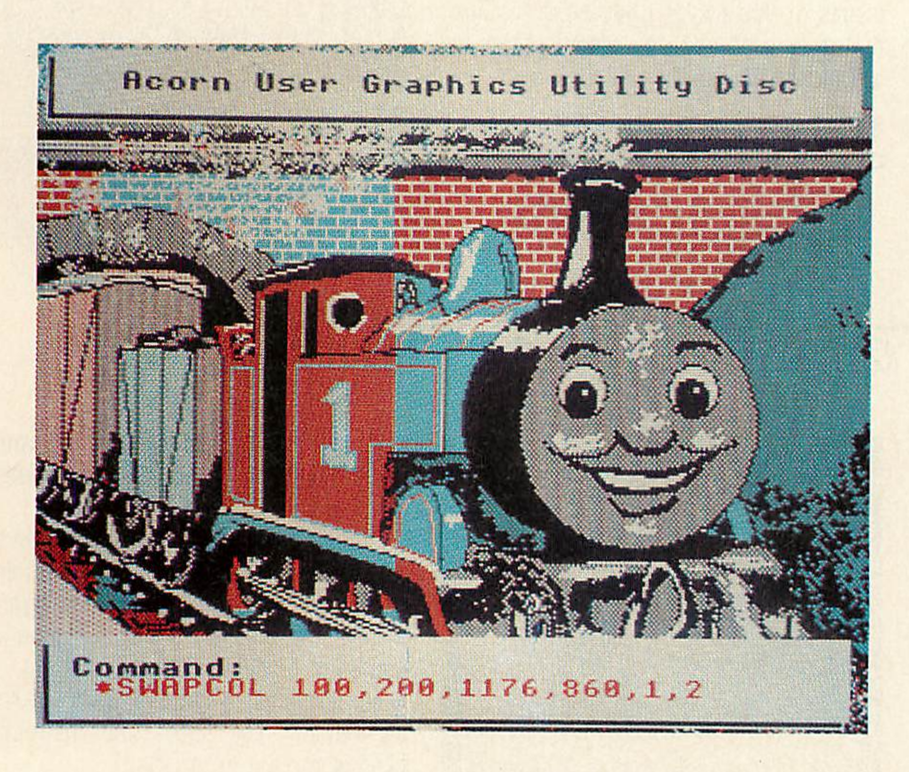
Epson-compatible screen dumps are included and screen dumps for other printers can be painlessly installed.

The software is on a 5.25-inch 40-track disc.



Sideways RAM made simple

The *Acorn User* sideways RAM disc includes: RAMpad – your computer's answer to the pad and pen; six different on-screen fonts available in all modes; a 15k printer buffer; Screen Swap – store and recall mode 4 or 5 screens; *ROMHEAD – standard service ROM header; *RLOOK – allows you to examine sideways RAM or ROM. There are many more utilities on this 40/80-track 5.25-inch disc – a snip at £9.95.



Graphics Utilities disc – a bargain at £7.95

The 40-track 5.25-inch *Graphics Utilities* disc features 16 stand-alone machine code utilities and much more – all for only £7.95.

The 16 machine code routines enable you to manipulate blocks of graphics. Rotation and reflection utilities are included, together with a screen compressor/expander, a colour flood-fill routine and three screen-mode conversion commands. Parts of any graphics screen can be saved, copied, moved, have their colour changed or two of their colours swapped.

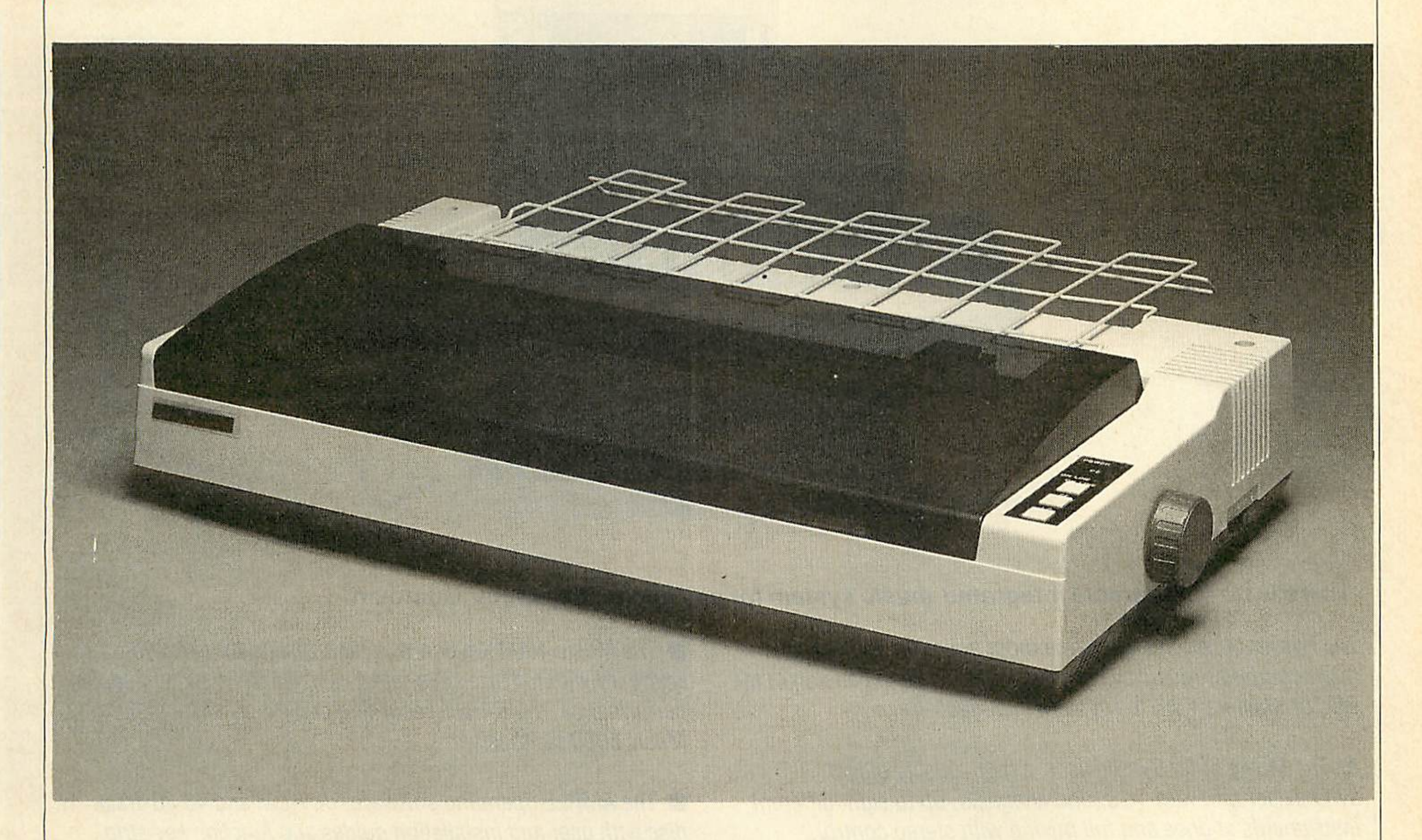
The Basic procedure library includes routines to produce multi-height, proportional and justified text as well as a procedure for 'drop shadow' boxes. All the procedures in the library can be used in your own programs.

An advanced teletext screen editor allows you to create colourful mode 7 screens which can be saved to disc. This routine gives you point plotting and line drawing, rubber-banding, and even a flood-fill. In addition, full text facilities including all the mode 7 control codes are available on this disc.

TO ORDER USE THE FORM ON PAGE 102

OFFERS

136-COLUMN PRINTER



Start printing with Acorn User's wide-carriage printer

You may have read in last months *AU*, that the EEC have put a 35% anti-dumping duty on printers. As a result, this is the last month we can offer this high quality 136-column Sakata printer for £259 including Vat and delivery. From 1st September 1988 our suppliers will be raising the price to £279.

The Sakata 5500 printer is Epson FX-compatible. It offers the following features: Pica, Elite and NLQ fonts plus a downloadable character set; a 3k printer buffer; friction and tractor feed for paper up to 16 inches wide; graphics modes compatible with *Acorn User*'s *UserDump* ROM; super and subscripts; bold and italics.

The printer is both fast and quiet, printing at a rate of 180 cps (draft mode) or 40 cps (NLQ mode) with a noise level of less than 55 decibels.

The Sakata 5500 printer takes ribbons which are easily obtainable. We are supplying each printer with a free 1.5 metre BBC printer cable, a plug, a 12 month guarantee and a supplement for the BBC. Post the coupon today.

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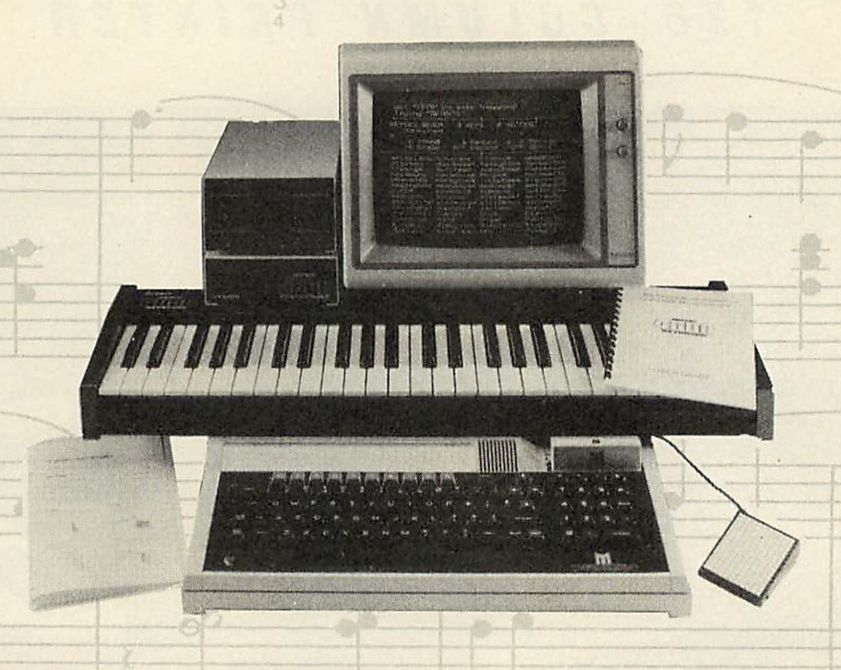
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OFFERS

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■ *The Music 5000 Synthesiser, a high-quality digital synthesiser unit with 16 sound channels, up to eight different instruments at once and full mixing with stereo control.*

■ *The Music 4000 Keyboard, a high-quality four-octave keyboard with full size keys, steel case and foot switch, adding performance, multi-track recording and music entry to the Music 5000 synthesiser.*

■ *The AMPLE operating software, on ROM and 40/80-track disc with user and installation guides and function key strip.*

***The Hybrid Music System features*:**

A digital keyboard synthesiser with 96 predefined sounds and an easy-to-use instrument design panel.
A music production studio with pitched instruments, percussion and sound effects in high-quality stereo.
An eight-track digital recorder with overdubbing, pattern sequencing, live mixing, editing and print-out.
The system can be used as:
A music composition tool with comprehensive staff and text notations in a structured language environment.
An educational music computer for creative use across the complete range of age, ability and application.
A computer music workstation with integrated user interfaces and an extensive real-time programming language.
A demonstration and research tool for a wide range of music and sound applications.

By special arrangement with Hybrid Technology, all *Acorn User* readers buying the Music 5000 synthesiser will also receive four AMPLE albums (*COSMIX*, *Ample Bytes Back*, *Music City* and *Inside Stories*) worth over £17, totally free. Our readers who purchase the Music 5000 and 4000 will be sent the four AMPLE albums plus the AMPLE Nucleus Programmer Guide, worth £36, absolutely free. This offer is exclusive to *Acorn User* magazine.

The Hybrid Music System is compatible with the BBC micro models B, B+, B+ (28k) and Master 128 with DFS compatible disc drive. Shadow RAM is used if available.

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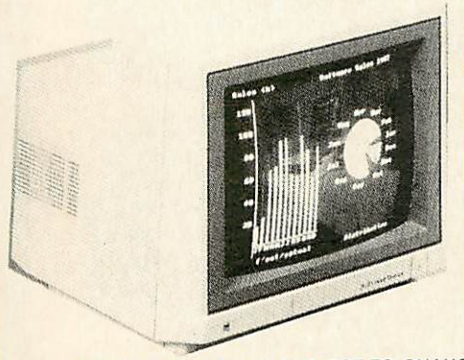
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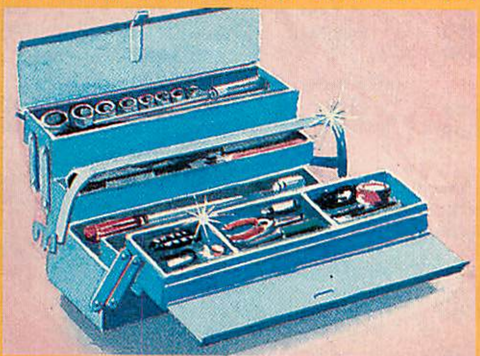


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A & B December 1987 & January 1988

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If you're a serious user then our 368 page Dabhand Guide on **Archimedes Assembly Language** is an absolute must and is packed full of information and advice on programming the Archie.

If you are interested in getting more power and more speed from your Archimedes then don't miss our stand at the PC Show. We'll be launching a major piece of software for the Archie that will change the way in which you program. As easy as ABC!

Beeb Users

See our other ad elsewhere in this issue for full details of our books and software for the BBC B, B+, Master 128, Compact and Electron.

Alerion

Archie Arcade Action!

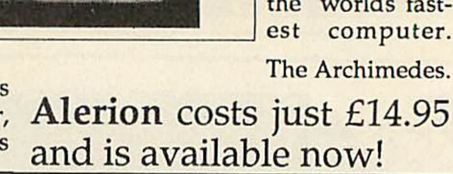
"A welcome return to the traditional shoot-em-up"

Alerion - an eagle without beak or feet is the Arcturian term for impossible and the codename for your mission in this exciting all action game.

Your space-fighter is equipped with revolutionary new equipment, not least a new radar cloaking system which renders you invisible, a holographic targeting system and unlimited fire power. To succeed your task is quite simple ... blow the living daylights out of anything that moves!

You have a bird's eye view of the action, your space-fighter flying over the varied enemy terrain, scrolling effortlessly beneath you. This is done by using the impressive 256 colour, high resolution mode. The game screen is refreshed 25 times a second by using two 80k screens in a highly innovative fashion, where one is dedicated to update while the other is used solely for display purposes. There is therefore no messy screen swapping. Just as impressive is the use of digital sounds which were sampled from professional sources giving the game an authentic feel.

Alerion is a welcome return to the most popular of all computer games but utilising the power speed, sound (not A305) and superb graphics only available on the worlds fastest computer. The Archimedes.



Alerion costs just £14.95 and is available now!

Archimedes Assembly Language: A Dabhand Guide

The first book specifically written for the Archimedes to provide a complete guide to programming the Archimedes in machine code. Whether you are an Archimedes owner, a user, or just interested in the ARM chip this book is the definitive guide.

In a massive 368 pages, author Mike Ginns provides a clear, step by step account of using the assembler. Many simple, useful, documented programs provide the practice to illustrate the theory making it ideal for the beginner.

Here's what Risc User said in their latest issue: "*The style of the text throughout the book is easy to read. Good, clear diagrams are used to make explanations easier. I would recommend Archimedes Assembly Language...*" At just £14.95 this Dabhand Guide represents full value for money. A programs disc is available for £9.95 or the two may be purchased for £21.95 when ordered together.

Available from all good bookshops

C: A Dabhand Guide

This superb 512 page book is one of *the* publications of 1988 and provides a step-by-step introduction and programming guide to C on the Archimedes. Beebug had this to say: "*...the book being full of good advice about program design and layout...a very good, resonably priced introduction to C for the non-specialist.*" Book £14.95. £21.95 with disc.

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GAMES

THE GAMES PAGE

Sam Greenhill previews 'new' arcade games for the Arc, *Bolo* from Go-Dax and yet another *Repton*

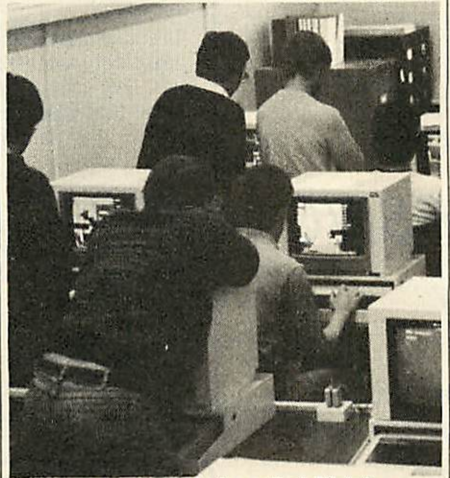
Breakout was a classic arcade game, so when home computers arrived, it was converted at once. Six years on, it reappeared under the name *Arkanoid*. Peter Johnson's version reached number seven in David Lawrence's top 10 for 1987. Who ever thought that a bat 'n' ball game that was on the BBC model B's Welcome tape could prove so popular?

Now Go-Dax is producing its version of the same game for the Archimedes, under the name *Fireball*. I've seen a copy and it looks good, though mouse control of the bat is a bit delicate. The sound is pleasant and the graphics reasonable. If your cupboard isn't already full of *Breakout* clones then it's worth buying.

A useful extra for those of you with Arcs is Gem's *Desktop Games* disc. Although it's a bit of a hassle to load in each time, the utility is quite good fun. Once loaded, the usual desktop strip along the bottom of the screen has three additional icons. The first is a star shape which acts in exactly the same way as the star icon in Minerva's *System DeltaPlus*. You click on it and it provides a blank screen with direct access to the operating system. You can type in star commands, or just press Return to go back to the desktop.

The second icon allows you to alter the volume directly and the third gives you access to three well-known games: *Mastermind*, *Solitaire*, and a sliding block puzzle. All three use the WIMP environment. The slider-puzzle game allows your own screensaved pictures to be imported from *Artisan* and *ArmPaint*. The package is cheap (£5.95) and good value. There is also a space-invaders game built in (this was around even before *Breakout*!) but it has been deliberately hidden. Try some trial and error clicking with the mouse on the *Mastermind* game.

After *Icarus* and the *Time and Magik* adventure compilation, Mandarin will be releasing a brand new graphic adventure written by Level 9 who originally wrote *Colossal Adventure* and *Snowball* for the BBC. It's called *Lancelot*, and should be around some time in the early autumn.



Bolo*, now probably to be called *Dictator

AU has been given a sneak preview of *Bolo*, Delos 'Joust' Harriman's new game for the BBC micro (and others) from Go-Dax. Imagine driving a tank around an island – you get a scrolling overhead view of the landscape, complete with roads, lakes and slowly spreading forests. Imagine being able to alter the landscape by digging lakes, building roads and even a 'whole' castle. Imagine pillboxes which fire at you, but which can be captured and moved to defend your stronghold. Fine, now imagine 15 other tanks being driven around by other players, all trying to do the same thing. You can ally yourself with others and hunt as a pack, or hole up in a fortress and wait for the action to die down.

It needs two or more micros, and you link them through their serial ports. It might even be possible to link Beebs with Ataris and Commodores when the game is converted! Up to 16 people can play. I watched eight enemies battle it out for two solid hours without flagging, but you'll have to wait until the autumn to get the disc. The best game for ages. Let's hope your pals have micros too.

Dabs Press is about to bring out another incarnation of an arcade game which became a Beeb and now an Arc game. This time it's a *Firetrack* clone called *Alerion* (which apparently means 'Eagle with neither beak nor wings'). It sounds a lot like *Quazer*, the game written by Julian Rockey and friends in Shropshire, which was reviewed in the July issue. *Alerion* has digitised sound, created using an Armadillo sound sampler – the same device as used in *Conqueror*. *Alerion* will cost £14.95 – £6 more than *Quazer*. It's written by a writer new to Acorn machines, Felix Andrew.

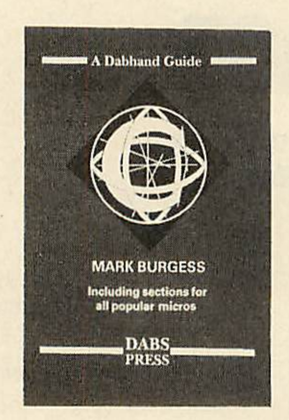
Next year Superior plans to release – no you're not dreaming – *Repton 4!* All I know at the moment is that, apart from designing your own screens and characters, you will be able to design the way some characters behave. Repton will be madder than ever with rocks falling upwards and monsters becoming tame. If Superior goes on this way, writers won't have anything left – users will be designing everything!

Finally, a cheat for *Hovabod*, Minerva's Arc game. Try pressing both Shift keys and the numeric pad divide key – this takes you straight to the last level.

Before I remind you to send other cheats, high scores and also suggestions for a new type of game (see last month's *Acorn User*), I'm putting out a special plea for some new *Revs* times. At present, L Surguy has pole position for every single track! Someone must be able to go faster. Here are the current times to beat: Brands Hatch, 1:23.7; Donnington Park, 1:08.5; Silverstone, 1:23.1; Snetterton, 1:00.4; Oulton Park, 1:13.9. Don't forget you must show some form of proof, ie, a witness or screen shot.

OFFERS

THE C HANDBOOK



The comprehensive guide to C

A behind the scenes storm has quietly been sweeping the microcomputer world during the last few years: it is the C programming revolution.

Mark Burgess has just completed perhaps the most comprehensive guide to C ever written. In a mammoth 512 pages he introduces the C philosophy in a highly readable no-nonsense manner. Page by page, you ascend the C ladder with simply illustrated and documented programs.

With 37 chapters, six appendices and glossary this book is amazing value for money. Programs from the book and many other useful utilities can be found on the program disc which comes with a user guide. Don't miss out – add this important publication to your library now.

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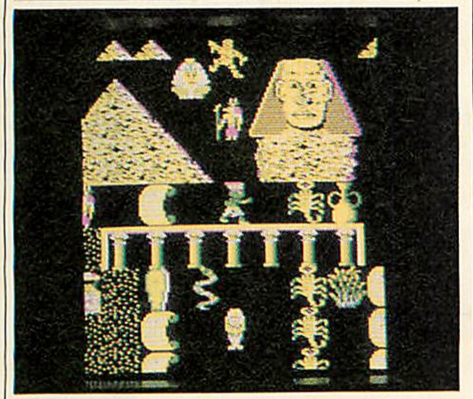
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GAMES

FOR LIZARD JUNKIES



Repton Thru Time; Superior Software; BBC: £6.95 (tape), £7.95 (5.25-in disc), £9.95 (3.5-in disc); Electron: £6.95 (tape)

If you had a winning product, would you stop selling it? Of course not, and that's exactly what Superior hasn't done.

Repton Thru Time is its third-set of add-on screens for the 'original' *Repton 3*. For those who haven't seen *Repton* before (both of you), you guide Repton around a 'maze' of obstacles, collecting objects to complete each successive level. *Repton 3* contained rocks, diamonds, skulls and monsters. In *Repton Thru Time* these have been replaced with new objects, but they all continue act in exactly the same manner as their prototypes.

In the original *Repton*, pieces of scenery were all separate. In more recent screens, like these, the scenery pieces have been designed so that they can be placed together to form one larger item.

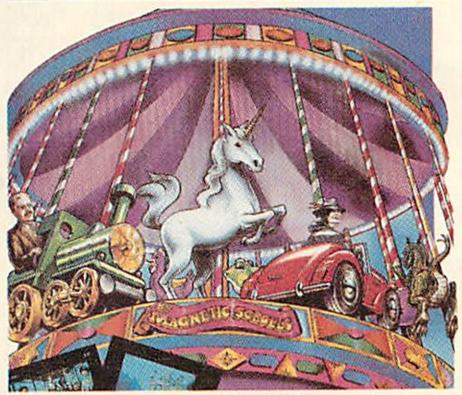
Repton 3 objects were also very easy to recognise. A rock was round and obviously fell downwards, a key would open a safe to reveal a diamond, and a monster might emerge from a cracked egg. In *Repton Thru Time*, a falling briefcase can squash you flat, a laser gun can 'open' a Dalek to get a diamond and a giant rat will appear from a disturbed (physically not mentally) dustbin. In this way, the graphics do look different, but the game play is identical.

If you are a certified *Repton* junkie (and who isn't?) you'll love this game too. And I also found the screens trickier than in the previous games.

With rumours of a completely new *Repton* concept just around the corner, this may be your last chance to experience the original *Repton* phenomenon – so I recommend you go out and buy it now!

Rob Miller

REIGNING ADVENTURES



The Pawn, The Guild of Thieves, Jinxter, Corruption; Rainbird Software; IBM PC; £24.95 each (5.25-in disc)

Although it's a division of Telecomsoft, Rainbird is little-known in the BBC games field – they don't actually sell any BBC games! But its four Magnetic Scrolls adventures do work under the Archimedes' IBM PC emulator. The only hurdle is that they come on 5.25-in discs. So you need to use a 5.25-in external drive interface (from CJE, Watford or Beebug), or get access to an IBM machine with both flavours of drive and back the game up to 3.5-in. Rainbird do allow you to make backup copies for personal use.

Once in the appropriate format, the games are started with a simple command. You'll be presented with a brief introduction to the adventure, followed by the description of the first location.

If you've seen these adventures on an ST or Amiga, then this may be a bit of a disappointment. My version of the PC emulator can't cope with the 320 by 200 pixel 16-colour graphics. But the descriptions are colourful enough. In my opinion, the most important part of an adventure is how good the parser is. The better it is, the easier it is to tell the computer to do something, and the Rainbird parser is extensive and easy to use. It allows you to use complex sentences including words like 'all' and 'except', pronouns such as 'it' and 'him' and adverbs such as 'quickly' and 'quietly'. The parser is certainly more sophisticated than any adventures produced for the model B.

Screen layout is simple. A main text area plus a single status bar at the top showing your score, number of moves and a two or three-word description of your location is very useful for mapping.

The Pawn is the most conventional of the four I tried; the world you explore, Kerovnia, consists of the typical plethora of caves, castles and caverns, with the old forest and lava river. The aim is to remove the magical arm-band that you are wearing, but before this can be achieved you must commune with mystic gurus, rescue princesses and even go to hell!

The Guild of Thieves again places you in Kerovnia, but this time you must collect or steal as much loot as you can, and return to the master spy. Armed only with *What Burglar?* magazine, you must penetrate the castle, grab what you can, then enter the caves and maybe the weird temple. Again, this is a fairly conventional adventure, although the scenario does make more sense than *The Pawn* – you don't suddenly find houses down coal mines!

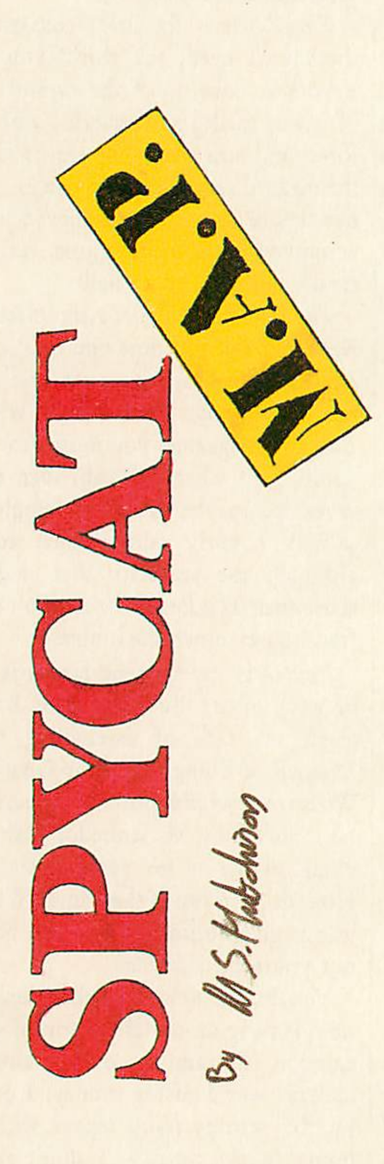
Jinxter is my current favourite, mainly because of its humour. You have been given the task of assembling the Lost Doodah of Thingy (as your Guardian Len Wossname would put it). Apparently it's been nicked by Ms Jannedor Nasty, who's going to use it for some illicit purpose. How do you finish the game? Werl, don't wanna give nuffin away so you better find out yourself, narmean?

Finally, the newest of the four, *Corruption*, is bang up to date. Set in modern-day London, the aim is to stay alive in the corrupt world of big money. I got 'done' by the serious fraud squad within three hours (game time) – I don't think I'm really cut out for this lark. My advice is to watch the film *Wall Street* first. The instructions come ready-punched with six holes for your personal organiser.

These adventures are of very high quality – a lot of thought has gone into the plots, puzzles and even the packaging. If you like a good adventure and have the cash, then I can't recommend any of them highly enough. I'm going to have another go at *Corruption*, and see if I can get anywhere in my BMW. . .

David Lawrence

TOP SECRET



'Q'

PM

NUMBER TEN

'M'

BLACKHALL

MINISTRY OF DEFENCE

SPYLAB

SPACEPORTER

STORAGE

The map of Superior Software's Spycat game was hand-drawn by Matthew Hutchinson, Superior's artist-in-residence. He's also responsible for several of Superior's loading screens

SHOW ME THE WAY

Find your route around the tortuous corridors of power with our Spycat map

The map shows all the 89 different locations that Spycat has to find his way through, from Blackhall to Greenland, where he can publish his memoirs. It isn't quite as easy as it looks, as you have to find objects along the way and use them in the right manner.

These aren't shown on the map, so the quest is still on to find them. There's a complete list of all the items you'll need to find below. Good luck – and always check you aren't followed when you leave the game!

Z88 computer
cup of tea
jeans
air ticket
thru permit
2 thru passes
4 side passes
typewriter
space permit
US secrets
USSR secrets
glucose pill
change
UK passport
$1000
disguise
1 coin
Sector One key
oxygen
research
spy report

SPREADING OUT

The first spreadsheet for the Archimedes has arrived. Dave Futcher sees if it makes the grade

The Archimedes definitely needs a powerful spreadsheet program to attain any credibility in the business world. It already has *Logistix*, a spreadsheet combined with time management and database functions. More recently there has been the release of *Pipedream* (reviewed next month), a powerful spreadsheet and wordprocessor. But neither of these packages is new, having been available on the IBM PC and Z88. So when *SigmaSheet* starts up, it opens with the message: 'The first spreadsheet specifically for the Archimedes'.

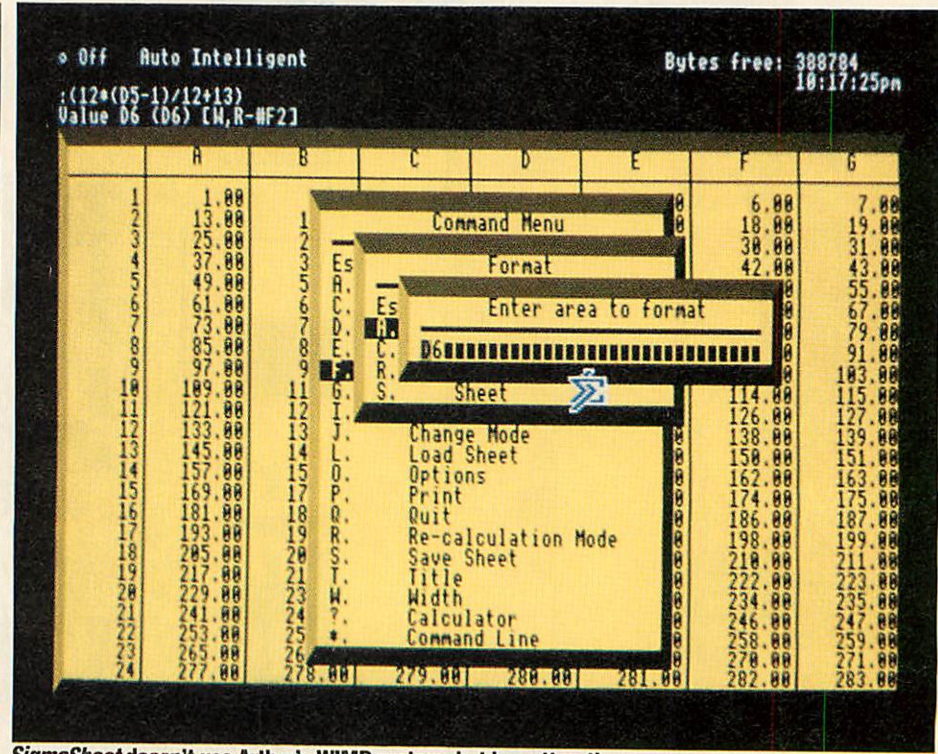
Unlike most software for the Archimedes, *SigmaSheet* is copy protected. It works on the 'key disc' principle: you can make a backup of the disc with the copy program provided, but you always need the original to start the system.

I was surprised and rather daunted at the first sight of *SigmaSheet*. I could hardly believe that the outstanding windows, icons, menus and pointers (WIMP) environment of Minerva's *System DeltaPlus* was missing. There are a couple of menus on which you can use both the mouse and the keyboard but to be honest, you may as well forget your mouse. It is not an excuse to say that some people will prefer the simpler screen layout and controls that *SigmaSheet* has, for windowing and WIMP controls can make spreadsheets easier.

I consider this strange. Surely Minerva realises just how good Microsoft's WIMP-based *Excel* spreadsheet is on the Macintosh? It really can make spreadsheeting easier. But despite its disregard for the Archimedes' WIMP environment, *SigmaSheet* is a serious contender in the spreadsheet stakes.

Screen layout

SigmaSheet's screen layout is similar to most spreadsheets. At the top of the screen various pieces of status information are displayed, and it's here that you type in commands. The status zone displays the recalculation mode, the amount of free memory and the recalculation direction. But the manual needs to be consulted to find out what the other status letters, symbols and words mean. Why isn't there a pull-down box with the status clearly explained? In fact the other status letters show whether the current cell contains a value or a label, its cell reference, the column and row titles, the display format and whether the cell is protected. By default, the display format for all cells is set to be writable and to display the value, comma separated and right justified, with a leading minus, no currency symbol and two decimal places. At first glance the way some of the status information is presented seems incomprehensible, but you do get used to it.



***SigmaSheet* doesn't use Arthur's WIMP system, but has attractive menus**

Underneath this mass of status information comes the spreadsheet itself. Column letters and row numbers form the boundaries at the top and bottom, and down the left side. Initially all the column widths are set and the sheet is completely clear.

Many users prefer to work with a particular set of screen colours, and with *SigmaSheet* you can set the ink and paper colours for four areas of the screen: the sheet, an area outside the sheet called the desk, the cell cursor and the colour of negative values. Eight colours are listed, but it is also possible to define your own.

Using the sheet

Commands that control your work on the spreadsheet can be selected in three different ways. The middle mouse button (Menu) pops up the Command menu, which offers 19 choices, including controls for copying, editing or deleting cells, printing, loading or saving a sheet, cursor movement and changing the recalculation mode. You select by moving the rather large and unsightly Sigma-shaped pointer with the mouse. When you are at the option you want, press the left (Select) button. This same Command menu pops up if you press the slash key (/). You can then select one option with the cursor keys and Return. If you choose options from the Command menu, you are taken to a large submenu with 12 choices. These let you select such things as screen colours, decimal format,

formula display and column gap. Menu selection is all right, but can be rather slow for experienced users. So most of the options on the Command menu can be selected by CTRL plus a letter. For instance, to edit a variable or a formula already in a cell you can use CTRL – E. You can also short-cut things with slash commands based on Command menu letters. Pressing Escape returns you to the spreadsheet.

Like any spreadsheet program, *SigmaSheet* allows you to put either text, numbers or formulae into any cell. To enter a formula or a value, it should be preceded by a '+' symbol and to force a label the text should be preceded by a quote character ("). I was surprised that the program could not work out what was being typed without these prefixes in the way that, say, *ViewSheet* does.

SigmaSheet makes it very easy to format the whole spreadsheet, ranges or individual cells to display values right or left justified. You can also control the format in which numbers will be displayed and the width of each individual column. The default column width of nine characters will be sufficient for many uses. However labels often need more than nine letters to avoid ugly abbreviations and you sometimes want to display longer numbers. Column widths can be up to 60 characters.

SigmaSheet allows rows and columns to be renamed with meaningful titles: a car dealer could have columns named BMW, Rover and Jaguar, and rows called In Stock and Sales. The cell where BMW and Sales cross can then be called 'BMW Sales'. This approach can be a great boon to people frightened by 'B72'.

In formulae the usual mathematical and conditional operators are available, and it's possible to include the logical operators AND, OR and NOT in expressions.

Functions are important in spreadsheets as they let you perform special or complex operations quickly and simply. PI for example, will place the value of pi in a cell, or you can total the numbers in a column with SUM(B1:B25).

Nineteen powerful and versatile functions are available in *SigmaSheet*, both arithmetical and trigonometric: LN, LOG, EXP, COS, ACS are familiar, but there's also ROUND, MAX, MIN, AVG, SUM and SUMSQ. The last of these is the sum of squares of values in a range – very useful in statistical work.

The date functions within *SigmaSheet* at first seem a little complicated. This is because a time and date is represented on the sheet by the time elapsed in hundredths of a second since 1900. But once this is understood, the usual DAY, MONTH and YEAR functions can be used to give the date in string form.

I was somewhat disappointed that there is no pre-programmed standard deviation function, nor a population variance, both of which are provided in Colton Software's *Pipedream* package. But do remember that when functions like these are not built in, they can be entered as formulae. I was more concerned, however, that *SigmaSheet* did not provide any of the financial functions such as NPV (Net Present Value) or IRR (Internal Rate of Return of an investment). Is this a lack of foresight by a software house that specialises in accounting software? Most of the 'best' and best-known spreadsheets for machines like the IBM PC have financial functions built-in. For instance the PC version of *Pipedream* has 11 financial functions – and even BBC Soft's *UltraCalc 2* for the BBC model B has an NPV function.

Recalculation of the whole sheet can be either automatic or manual. Automatic means the computer recalculates after every alteration, while manual means the sheet is only recalculated when you press ALT – R.

Very often spreadsheets only recalculate in one direction. *SigmaSheet* has three different techniques for calculating the sheet. With vertical calculation, the entire sheet is calculated starting at the top left and moving down each column in turn. With horizontal calculation the sheet is calculated starting at the top left and moving across each row in turn. The third method is an advanced technique that allows *SigmaSheet* to calculate the sheet 'intelligently' with direction depending on the ways that formulae refer to one another. These different modes can all be selected from the Command menu.

It is sometimes essential that spreadsheet cells are protected so that data cannot be inadvertently entered, or formulae cannot be altered, and many spreadsheets have separate LOCK and UNLOCK commands for this purpose. With *SigmaSheet* there is no direct control command; instead it is achieved from within the Format option where a single cell, column, row or area of a

SPREADSHEET BENCHTEST

	ViewSheet	InterSheet	SigmaSheet	Pipedream
Maximum number of rows	*83*	*84*	*1203*	*325*
Recalculation (A1 1 to 2): rows per second	*7.34*	*14.89*	*34.47*	*40.47*
Recalculation (A1 1 to 1.5): rows per second	*7.16*	*12.23*	*34.18*	*39.29*
Vertical scrolling: rows per second	*0.53*	*0.67*	*5.09*	*11.73*
Horizontal scrolling: columns per second	*1.59*	*4.48*	*4.53*	*6.43*

Minerva describes *SigmaSheet* as 'The world's Fastest and Largest spreadsheet', and '200 times faster than *InterSheet*, *Logistix* and *Lotus 123* and 1600 times faster than *ViewSheet*'. Is this true?

An accepted standard for spreadsheet testing was published by Mike Liardet in *Personal Computer World* February 1983. We compared two well established BBC spreadsheets and two brand new spreadsheets on the Archimedes: *ViewSheet* and *InterSheet* on a Master 128, and *SigmaSheet* and *Pipedream* on an Arc 310.

The benchmark cells contain formulae testing all the arithmetic operators and the common summing function, and it's set around a spreadsheet designed to simulate a typical 12-month financial calculation, involving 12 columns plus a 13th column as the sum of the other 12.

The first test is to ascertain the 'true' capacity of the spreadsheet: how many rows of the standard spreadsheet can be held in memory? The four subsequent benchmarks test performance when the spreadsheet is running at full capacity. The BBC micro packages are included because they are familiar, and the figures do show how good this old 8-bit software still is.

SigmaSheet probably does offer the largest spreadsheet capacity on a micro. On the 1Mb Arc 310 we were able to create a spreadsheet with some 15,639 cells. This was considerably larger than the 4225 cells that *Pipedream* offered. But remember that *Pipedream* is a far larger program, offering wordprocessing and a simple database as well as a spreadsheet. Surprisingly, *Pipedream* was considerably faster than *SigmaSheet* in its recalculation. It managed 40 rows per second against 34. Both figures are fast – the 'standard' PC running *Lotus 123* can only manage seven rows per second!

sheet can be made protected or writable. It works, but it should be easier to access.

Replication is at the very heart of the spreadsheet concept. This allows a formula to be entered once, say for the month of January, and then copied automatically for all the other months of the year. Replication in *SigmaSheet* is extremely powerful. It is simple to use and requires only the minimum of keystrokes. Every conceivable variation of replication is possible, from one cell to another, from one cell to a range, from one column or row to another or from one range to a whole block.

What, no windows?

SigmaSheet does not have any sort of windowing arrangement which enables you to hold certain rows or columns on the screen, while also looking at another area of the sheet. What a terrible omission this is – doubly strange as both *ViewSheet* and *InterSheet* offer facilities of this type. So do popular spreadsheet packages for the IBM PC. I think that Minerva has made a serious error by not offering facilities that enable you to split the screen into windows and look at two parts of a spreadsheet at the same time.

Summed up

The manual runs to 76 pages, but with far too much text on a page. After a too brief introduction to what spreadsheets can do, the reader is given an introductory tutorial called the 'Experimental Section' – this is designed to guide the user through the main features of *SigmaSheet*. But I feel that not enough use has been made of the sample files supplied on the disc in explaining the functions available.

The manual actually comes into its own in Section 5, where the principles of setting up a statistical sheet are demonstrated. Here you are shown how to build up a spreadsheet which calculates the equation of the 'line of best fit'. Although everything is in there, and there is an index to help you, some items seem to be well hidden.

Minerva has certainly produced a fast and reasonably powerful spreadsheet for the Archimedes. But I'm afraid it isn't quite right. A number of things seem sadly wrong, and despite the speed of calculation and the large potential size of the sheet, *SigmaSheet* really lacks the power that a new spreadsheet for a 32-bit micro should have. A number of expected functions (notably financial ones) seem to be missing. Windowing is not catered for at all. The way some commands, such as protecting cells, are implemented don't give the control you might expect.

Despite the fact that *SigmaSheet* does not live up to what I expected from 'the first spreadsheet specifically for the Archimedes', it will nonetheless satisfy most people's need for a spreadsheet. It did perform admirably. I just expected more. . .

Sigmasheet *for the Archimedes, £69.95 from Minerva Software, 69 Sidwell Street, Exeter, Devon EX4 6PH.*



SOFTWARE

ON TOP FORM

Dave Futcher looks at two packages – one to help you design your own forms, and one to design your filofax pages

Anyone working in the world of business or education needs forms. Petty cash claims, questionnaires, school timetable blanks and records are all common examples. Elaborate and expensive desktop publishing packages can provide the facilities to design and print forms.

But there is a cheap and effective program to generate forms on any Epson FX or RX-compatible printer. Mewsoft have come up with *A4 Form Designer*; it costs just £9.95 but needs a Master series computer as it uses two sideways RAM slots.

The package allows you to create tables, charts and boxes, save them to disc and print them out. You can type text anywhere on the screen and delete as necessary, but there is no word-wrap or insertion as on a full wordprocessor. The designer works in true Wysiwyg style on a white 80-column screen, with a simple method of box-drawing and text input.

The screen is a window on a complete A4-sized form, which is up to 70 lines long. The four cursor keys move you around the window, and your form scrolls from top to bottom without any disc access, unlike AMX *Stop Press*. You can write text anywhere on the page. Position the cursor where you want the text to start, and type away.

Although text is important on forms, lines and boxes are more so. Mewsoft has ensured that line drawing is effective yet simple. Drawing lines across or down the page is simple – just hold down function key f0 while pressing one of the cursor keys and a black line will be produced on the screen.

So far what's on offer sounds great, but that is not all you can do with *A4 Forms Designer*. Text can be inserted directly on to a form from a number of BBC-based wordprocessors. For example one teacher could design a class register or mark sheet, for use by a group of teachers with different classes. Rather than add the names or details to each individual form you create a list of the students' names for each form using a wordprocessor, and store them on

CALENDAR FOR 1989

JANUARY

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

FEBRUARY

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

MARCH

Su	Mo	Tu	We	Th	Fr	Sa
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5	6	7	8	9	10	11
12	13	14	15	16	17	18
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APRIL

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MAY

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JULY

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OCTOBER

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NOVEMBER

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DECEMBER

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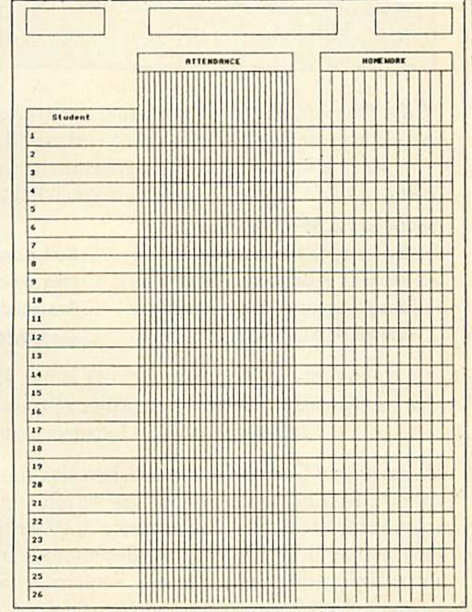
In February 1988 we looked at the *Fax*File Organiser* from MewSoft. Now an extension disc has been released. It adds four extras to the original program.

The label printer uses the data held in address files to print labels. Many people like quick and accessible pages simply containing names and telephone numbers. The Short Form option makes this possible. Again the data from the address book files is used. The database editor allows you to set up lists with up to sixty entries. The final extension is a Calendar Printer, which prints out the year of your choice in condensed subscript type.

*Fax*File Extension Disc* is a very useful addition. At £9.95 it seems great value.

disc in the D directory. When creating the form, the names can be inserted in the register or mark sheet by calling up the menu with f9 and selecting the Load Data option. It's a great way to use the same blank register again and again to produce registers for a whole school.

The Set Up option on the main menu allows for a certain amount of customisation of your print-out, offering the choice of whether to use the computer's or the printer's character set. There are distinct advantages in using the computer's character set as you can easily redefine the BBC's characters. Don't forget that the Master 128 Welcome disc has a thin and bold character set available. You could also redefine keys to give mathematic or scientific symbols and, with a little bit of work, rounded corners could be implemented! It's a question of simply adding a few lines



School record sheet produced with the package

to the *Form Designer* menu program to customise it! Or you could use the printers' characters in NLQ mode to give a very professional result.

A4 Forms Designer will allow you to produce a whole host of forms, record or data sheets. It's ideal for creating pages with blank boxes for later insertion of hand-written information or for 'boxing' up information on a written sheet of paper. Schools will find the designer extremely handy for class registers, mark lists or reading records.

A4 Forms Designer: *£9.95 for the Master 128 from MewSoft, 11 Cressy Road, London, NW3 2NB.* Fax*File Extension Disc: *£9.95 for the BBC micro and Master 128.*

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(Domark)

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Terramex, from Bugbyte, is a classic conversion from the Atari ST and Amiga.
Missile Control is about as close to the original arcade version you can get.
Hoverbod is an arcade adventure with devious puzzles and excellent graphics.

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Elixir	(Helpsheet + maps)
Paperboy	(Helpsheet)
Twin Kingdom Valley	(Solution + map)
Omega Orb	(Solution + map)
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M = Master compatible

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SOLVE YOUR DIFFERENCES

Transferring files from one machine to another of a different kind is not that easy. Robert Elwell looks at a package that may make things simpler

It seems that for each new machine there must be a new floppy disc format. The result is you can't read files from one machine on others of a different type. Serial links are one answer – put the different machines back to back, connect the serial ports, and with luck transfer the files. Alas, getting the pins of the serial lead properly matched can be a problem.

Another answer is to employ a program that uses one machine's floppy disc drive to read the disc from another machine. The more flexible the machine's disc drive controller, the greater the number of formats it will be able to read. *BeebDOS* from Microboss is one such utility. It converts between the BBC micro's various disc formats and MS-DOS formats used by the IBM PC and related machines. The BBC formats covered include the Watford, Solidisk and UDM double-density systems, the Opus double-density system (volume A only) or the Acorn ADFS. Single-density formats are also convertible, but as will become clear, this is the greatest weakness of the whole package.

Microboss decided that all the work should be done on the PC. As a result *BeebDOS* is supplied on a single 360k IBM PC disc. There is a range of programs which operate on BBC micro discs, but there are restrictions about which formats are acceptable depending on the PC's exact configuration. Unfortunately, *BeebDOS* will not work on a Nimbus – the most common MS-DOS machine in schools.

Once inserted into the PC drive, BBC micro discs can be both read from and written to – ideal for file transfers. But in practice there are several steps to take first. BBC discs can also be catalogued, formatted or compacted and files can be locked or unlocked. Finally, graphics screens can be converted for the IBM display.

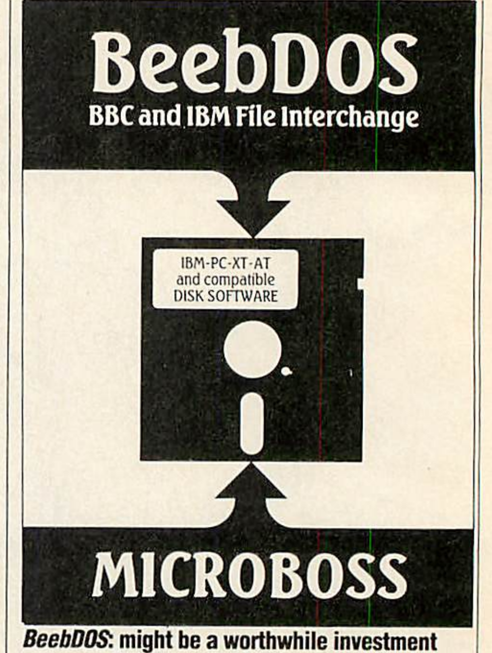
The real problem with *BeebDOS* lies with the constraints imposed by the type of PC hardware you have. The IBM PC or XT have 360k disc drives – 40-track, double sided, double density. A PC AT-type machine normally has 1.2M drive (80-track, double sided, quadruple density), and if a second drive is fitted it is often the 360k type. You need an AT with a 1.2M drive to read 80-track double-density discs – probably the most common ADFS type, the equivalent of large format. You can't read an 80-track single-density disc at all, and you can only read a single-density 40-track disc in a 360k drive mounted in an AT. Worse still, you can't read single-density discs at all in a PC. If you are confused, the table below will help, but with anything less than an AT with both 1.2M and 360k drives you will find that

To transfer from	IBM Equipment needed
Double-density 40-track	IBM PC. XT or AT with 360k drive
Double-density 80-track	IBM AT with 1.2M drive
Single-density 40-track	IBM AT with 360k drive
Single-density 80-track	not possible

Table 1. Equipment needed to transfer files

your options are closing in. So you may need to transfer data from a 40-track BBC disc to an 80-track disc, and for this you need suitable drives. It's sometimes best to format the 40-track disc in the PC's 360k drive, and you can use the BFORM program that's part of *BeebDOS* to do this.

A typical process might be tried to transfer your *View* files, so that they can be desktop-published in one of those very expensive packages that run an a PC. If you have an AT or 40-track BBC drives, fine. If not, you first have to transfer the files to, say an ADFS small format 40-track disc. Then you have to run the BDOS program on the PC to tell it which format the BBC disc is – the system defaults to Solidisk double density. Then run the PC program BCOPY to copy the files onto a normal PC disc. It is possible to add a string of parameters to the BCOPY command to specify source and destination filenames, but the possibility of error is very real. If no parameters are provided, the program prompts for all the relevant information – safer, but much slower.



***BeebDOS*: might be a worthwhile investment**


Transfer files to IBM clones

The ability to swap between formats can be very useful, if highly time-consuming. An example is downloading some data from a mini-computer which uses a BBC micro as a terminal; this terminal being equipped with ADFS. My own micro's DFS is single density. So the answer is to

use the terminal to download the data, temporarily transfer the data from the ADFS disc to the PC, then change the filing system on the PC with BDOS, and copy it back to a DFS disc. Then you have to re-copy it from 40-track to an 80-track disc! It is a long drawn out procedure, but *BeebDOS* works as advertised.

A major use for *BeebDOS* will be transferring text files to and from the PC. A useful utility BCONV will help. It first reads a file (called for example VIEWIBM.ALT), which specifies all the substitutions to be made. It then reads your source file, performs the search and replace, and writes the result to a new file.

BCONV allows control characters and other unwelcome parts of the file to be removed or replaced. If you dissect and compare files from different wordprocessors it should be possible to write an ALT file to convert directly between them. Several ALT files are provided. VIEWIBM.ALT converts *View* files to simple text files. Sadly, in the output from BCONV, the text retains its embedded commands inherited from *View*. They could presumably become the cues for a further ATL file to provide the stored commands of your favourite MS-DOS wordprocessor. BCONV isn't limited to converting your BBC files – you can use it to translate between different PC wordprocessors too.

BGRAPH is a bonus program to display BBC screen files on the PC, although only Modes 0,1,4 and 5 are supported. But BGRAPH works only if you have a CGA (Colour Graphics Adapter) monitor with your PC. EGA (Enhanced Graphics Adapter) and Hercules displays aren't supported. BLOAD is the program that allows you to actually load the converted screen files – a bit like *LOAD SCREEN 3000 on the BBC micro.

If you have a BBC and PC sitting not too far away, you probably already have a serial lead to connect them and transfer files. If you haven't, invest in such a lead: It's cheaper and a great deal easier. Should you only want to transfer a very few files, find someone with the above setup, or send your discs to a firm which does disc conversion – there are several around. If one machine is in one place, and the other machine is a long way away, if your equipment configuration matches the table, and if you regularly transfer files, then BeebDOS may just be for you.

BeebDOS *is available direct from Microboss Ltd, 3 Hadleigh Road, Frinton-on-Sea, Essex CO13 9HG. Tel: (02556) 71095. It costs £46 including VAT.*

BOOKS

IN ACTION

Tony Quinn looks at two books that show how DTP can help keep up standards in design and publishing

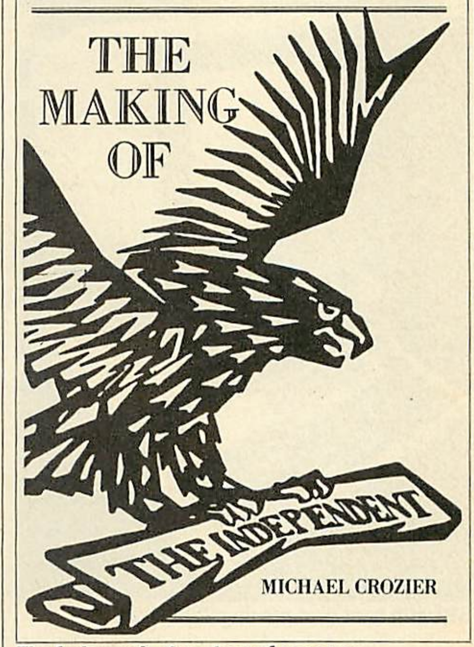
The Making of The Independent by Michael Crozier, Gordon Frazer, £8.95. DTP: The Complete Guide to Corporate Desktop Publishing by Robert Jones, Cambridge University Press, £15.

At a national level, computers have released newspapers from the shackles of production. So it's ironic that in offices all over the country new desktop publishing systems have reintroduced the agonies of the production process, to the detriment of design and writing. Here are two books that revive some of the real issues of publishing, rather than act as over-blown hardware and software reviews.

First there's *The Complete Guide to Corporate DTP.* You won't find a single mention of the BBC or Archimedes in this, it's all IBM PCs and Macintoshes. What you will find is a clear, well-illustrated, and readable introduction to desktop publishing, from buying a system to designing a page. The book is particularly good on design from the top, as befits its origins. It comes from Robert Jones of Baddeley Associates, a 'leading information design company'. And the book certainly practises what it preaches, for the company designed, illustrated and typeset the book. However, I do wonder whether Terence Conran's 150-word introduction, the word 'corporate' in the title, or Baddeley's fees are to blame for charging £15 for a 132-page book.

Jones has produced lots of checklists of do's and don't for most aspects, which are worth following. In fact, if the book has a failing, it's in not pointing out enough that it does take a lot of experience before you can do even something as basic as judge the size of a typeface.

Similar ideas to those discussed in *Corporate DTP* were put into action by Andreas Whittam Smith and his team, when they launched *The Independent* newspaper. In *The Making of The Independent*, Michael Crozier follows Britain's newest national newspaper from the germ of an idea hatched undercover at *The Daily Telegraph*, through the tribulations of the design, the fight over the eagle, to page designs in January this year.



***The Independent*: a story of success**

The style is a bit self-congratulatory, but then there's little cause to begrudge them that, having created within a year what could arguably be the best national paper in Britain. The book reads as if it was built up from a diary, and I would have appreciated more flesh on it, along the lines of Tracy Kidder's brilliant *Soul of a New Machine.* But then Crozier is a journalist brought up on the values of hot metal and accuracy. It's those values that lie at the heart of *The Independent.*

Journalists and readers interested in DTP will appreciate being exposed to WOBs and BOTs, a brief history of newspapers, and chuckle on reading that *The Independent's* excellent pictures are still pasted into holes left for them on the made-up pages because the computers can't cope.

A headline on one of *The Independents*'s pages reproduced by Crozier reads: 'The death of design'. These two books do their fair share to make sure that standards in design and publishing won't fall despite all the terrible things that DTP and computers are doing to it.

PC POINTERS

For those of you with Master 512s, here's the latest compatibility listing

Tony Quinn


512 with hard disc running GEM *Write*

This listing follows on from the article in November last year and has been compiled from comments by readers and Acorn's own compatibility list.

The Master 512 uses the 80186 processor which is the same as in the Nimbus PC, and if you haven't already got them, you should upgrade to Acorn's latest DOS Plus discs. You can get version 2.1 of DOS Plus and the latest BIOS ROM as an upgrade from Acorn for £15 – or £25 on 3.5-inch discs. DOS Plus 1.2 is designed to work just like MS-DOS 2.1, but Microsoft are now up to version 3.2 or 3.3, so look out for this on packaging and note the version number of the software in the listing. Earlier or later versions may not work.

PC compatibility is also now an issue on the Archimedes, and we'd like to hear from readers on that score – you'll see on the Games Page that Rainbird adventures run (though without their EGA pictures). When writing to us, make sure you state clearly you're using an Arc. Here of course it's also important to say how much memory you've got and which version of the PC emulator you are using.

SOFTWARE THAT WILL WORK ON THE MASTER 512

TITLE	VERSION	SUPPLIER	COMMENT
Ability Plus		Migent	Except Comms & tutor
Accountant Plus	1.0	Sage	Colour problems
Ballyhoo		Infocom	
BBC Basic 86	1.0	M-Tec	
Book Keeper	1.0	Sage	Colour problems
Bureaucracy		Infocom	
C Prime		Aztec	
Cardbox Plus		Business Simulations	
Dataease	2.5		
Dbase II	2.43	Ashton Tate	
Dbase III+		Ashton Tate	Fewer open files than MS-DOS
Dbase IV	1.00	Ashton Tate	As far as tested
Deadline		Infocom	
Delta	4.0		
Desktop	1.0	Sage	Colour problems
Displaywrite II			
Displaywrite III			Needs installing
DR C	1.0	Digital Research	
DR Fortran	1.0	Digital Research	
DR Pascal	1.0	Digital Research	
DR Personal Basic		Digital Research	
DR RASM	1.0	Digital Research	
Easywriter			
Enable			
Enchanter		Infocom	
Exchange	1.0	Psion	Needs installing on a PC first
Executive Filer	1.0		
Executive Speller	1.0		
Excutive Writer	1.0		
F77 Fortran	1.0	Fortransoft	
Financial Control	1.0	Sage	Colour problems
Flight Simulator	2.12	Microsoft	Not 2.13
Fortran		Prospero	
Framework II	1.0	Ashton Tate	Except scroll lock
GEM Diary	1.0	Digital Research	
GEM Draw	1.0	Digital Research	
GEM Graph	1.0	Digital Research	
GEM Wordchart	1.0	Digital Research	
GEM Wordcraft	1.0	Digital Research	
GW BASIC	1.0	Olivetti	
Graphics Toolbox		Borland	Used with Turbo Pascal
HAL			
Hitch Hikers Guide		Infocom	
IBM Assistant			
Infidel		Infocom	
Integrated 7			
ITT XBasic			
Javlin Plus			
Kedit			
Lattice C	1.0		
Leather Goddesses		Infocom	
Lets C			
Logistix	1.0	Grafox	
Lotus 123	1.0a	Lotus	Not 2.0. Latest version works
Microsoft Basic	2.0	Microsoft	
Microsoft C		Microsoft	
Microsoft Cobal	2.1	Microsoft	

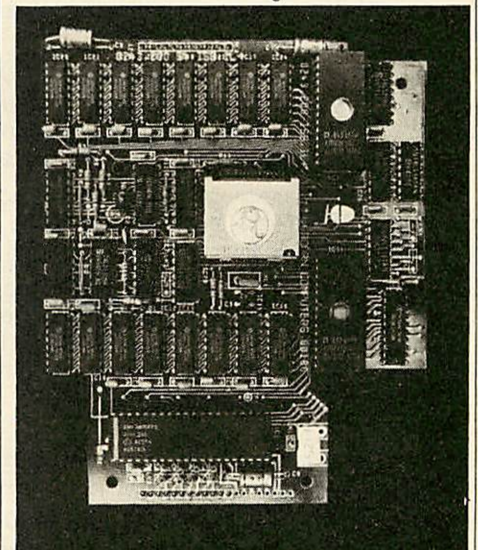
Microsoft Fortran		Microsoft	
Microsoft MASM		Microsoft	
Microsoft Pascal		Microsoft	
Microtext			
Multimate	3.2		Except DEL key
Multiplan	2.02		
New Word 3	3.01	New Star	Files limited on DOS+ 1.2
Paradox	2.0	Borland	Except personal programmer
PC Boss	2.06		
Payroll	1.0	Sage	Colour problems
PC Calc			
PC Four	1.0	Psion	
PC Outline			
PC Paint	4.0		
PC Planner	1.0	Sage	Colour problems
PC Prolog			
PC Promise	1.12		
PC Storyboard	1.11		Except camera
PC Talk			
PC Tools			
PC Write	2.7/2.55		Only works in insert mode
PC Write	1.0	Sage	Colour problems
Pegasus Accounts		Pegasus	
Perfect Calc			
Perfect Filer			
Personal Editor	1.0		
Planetfall		Infocom	
Printmaster			
Quest			
Quick Basic		Microsoft	
Reflex			
Retrieve	1.0	Sage	Colour problems
Rogue			
Slidewriter+			
Smartwork			
Sorceror		Infocom	
Spellstar		Micro Pro	No problems
Stationfall		Infocom	
Supercalc II		Computer Associates	
Supercalc III	2.1	Computer Associates	
Supercalc IV	1.0	Computer Associates	
Suspect		Infocom	
Suspended		Infocom	
Turbo C	1.0	Borland	Limited screen
Turbo CAD	1.0	Borland	
Turbo Editor	3.0	Borland	
Turbo Graphics		Borland	
Turbo Pascal	3.0	Borland	Much faster than PC, but text display slower
Turbo Pascal	4.0	Borland	Requires DOS+ 2.1 some problems on editor
Turbo Reflex		Borland	
Twin	1.3		
Volkswriter 3	1.0	Lifetree	
Volkswriter Deluxe		Lifetree	
VP Planner	1.0		Requires loader
VU Writer			
VU Writer Scientific			
Wishbringer		Infocom	Amstrad PC1512 version won't run
Wordstar Prof.	4.0	Micro Pro	Requires DOS+ 2.1
Zorland C			Slight Problems
Zork I/II/III		Infocom	

SOFTWARE THAT WILL NOT WORK ON THE MASTER 512

First Word Plus			
Fortran 77		Ryan McFarland	
Framework		Ashton-Tate	
GW Basic			Load/save problems
PC-Outline			
Symphony		Ashton-Tate	
Turbo Basic		Borland	
Word		Microsoft	

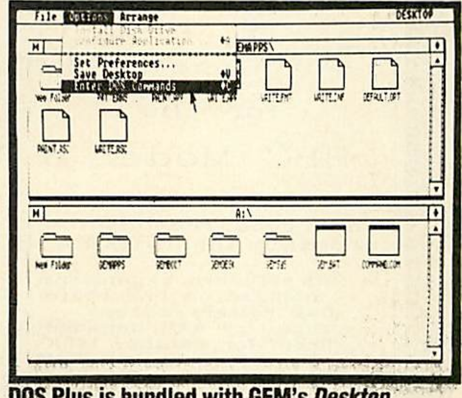
Protected software can also run into problems because the 512 does not use the PC disc controller chip which plays a part in a lot of protection routines. On the disc front, remember that DOS Plus uses an 800k format whereas PC discs are formatted to 360k, so disc utilities should be used with great caution as they can corrupt files. Also, discs formatted on the 512 may not be readable on a PC, whereas discs formatted on a PC should be fine on both.

Some schools are using the Master 512 as



Master 512 co-processor board

a stepping stone between BBC micros and the Nimbus PC, especially for word-processor files and Basic programs (BBC Basic is available on the Nimbus). We have also heard from a software developer who's



DOS Plus is bundled with GEM's *Desktop*

using a 512 because it gives him the speed of a PC-AT, and if software runs on the 512 it runs on everything!

We hope to carry updates to this list and would like to hear from readers who use the Master 512 – particularly if you've experience of software not on the list. Write to: PC Compatibility, *Acorn User*, 20-26 Brunswick Place, London N1 6DJ. Please state which version of DOS Plus you're using, and give full details of the software publisher and version number.

BUSINESS

JUST THE TICKET

For printers and publishers, for mathematicians and scientists and for those of you who may need advice

Roger Carus

In writing this series I find I can never predict which items will attract a response, and if I guess, I am usually wrong. A few months ago, I mentioned a contribution from D Ketteringham of Harrow Weald which was concerned with typesetting on an old-fashioned Adana printer of the kind that is very often used by clubs, schools and societies to do simple jobs such as printing tickets.

To my surprise it produced more response than any single report in the last six articles, and not only that but it also brought in several letters from readers about similar ventures.

On the same track of follow-up stories, but from much further afield, came a letter from Jan Southberg in the Netherlands with details of several programs he has developed for the Compact and, before that, the Electron.

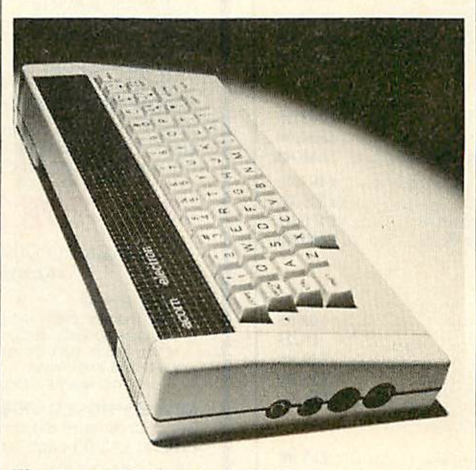
The one which first attracted my attention was mainly concerned with printing and publishing. It was designed to produce machine-readable text for typesetters. Using an Epson FX80 printer, it has been used for producing contents lists in scientific journals.

Mr Southberg also described more of his work, most of which is concerned with mathematical or physical science applications. These include a system for foolproof conversion of numbers from one base to another; a simple mode 0 screen dump written in Basic and finally, a program for the generation of fractals and saving the results.

Perhaps the greatest pleasure comes when someone recognises your own program as useful, and this came to me personally with a letter from Kate Crennell of the Rutherford Appleton Laboratory. She collects programs suitable for use at careers conventions, and thought that my own simple program to help in the choice of universities might be useful. In return, she kindly sent me a disc with several excellent examples of programs which she herself uses, and most of these are, as you might expect, for physicists.



Craft and technology: help available



Electron publishing in Holland

Surprisingly few of the letters I get are from schools, and with so many BBC micros in classrooms, I can only guess that many teachers (and pupils) are shy about revealing what they are doing. I am curious about the number of ideas which have been developed for the administration of schools and colleges.

If you have any experience of developing and using these or other types of programs in your school or college, send them to me at the address below – others may be interested in what you are doing.

Finally, a letter has come in from Anthony Kay, who runs an advisory service based in south London. Micro Advisory Services tries to help local authorities and small companies rather than individuals. The company started out by offering its services directly to home enthusiasts who needed advice, but Anthony soon discovered that the prices necessary to make the service a commercial proposition were more than most individuals could afford to pay – however much they wanted or needed his help.

Unlike other advisory services and consultancies which often only provide assistance on very technical problems, he aims to help people who have difficulty deciding what hardware or software they need for their particular application. He also tries to give help in using software packages, particularly in the areas that the manuals may have 'left out'.

If you have any problems of this nature, particularly in the areas of desktop publishing (DTP) or craft and design technology (CDT) then he can be contacted at Micro Advisory Services, 314 Upper Richmond Road West, London SW14 7JN.

IDEAS WANTED

If you use your micro for business or pleasure, or have written a piece of useful software, and would like to share your knowledge and experience, write to Roger Carus, c/o Acorn User, *Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ: British Telecom Gold: 81RED001.*

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LETTERS

Acorn User, 20-26 Brunswick Place, London N1 6DJ. BTG/TTNS 81:RED0010

DON'T FORGET THE ELECTRON

Sir, As far as I can see, the only reference to the Electron most months is actually on the front cover of the magazine, just before the word 'Archimedes'. This may at first seem a little far-fetched, but I think it accurately describes *Acorn User's* recent service to us Electron owners.

In your defence, I have to admit that *Acorn User* has been good to the Electron-owning fraternity in the past, hence my copy every month. But over the past eighteen months, I do tend to feel a little disappointed when I read my issue and discover the neglect of the Electron.

Occasionally there are some reasonable articles, but these are usually confined to a solitary page, and are too few and far between.

The world of the Electron-owner is an exciting and constantly expanding place, with second-processors, disc systems, shadow RAM, and many other things being released for the machine.

Many Electron owners, like myself, have extensively upgraded our systems from the rather limited basic machine. I myself have fully BBC-compatible DFS, and a shadow RAM board, giving me both a 300 per cent increase in speed, and 28k available in any mode.

Other Electron owners have mice, RS423 serial ports, 1Mhz interfaces and many other add-ons. There is even true mode 7 available.

I feel I am expressing the opinion of many Electron owners when I say that you should give us our own area in *the magazine.* We don't want the Electron to fade forever from the pages of *Acorn User* – to see this happen would indeed be a great pity.

S Cusack
Cambridge

It should be noted that in the May 1988 issue we did review the mode 7 adapter you mention. Although the recent lack of Electron coverage might be seen as a move away from Electron hardware and software, we still try to maintain it when possible.

A new computer such as



The neglected Electron?

the Archimedes is obviously going to get a large 'piece of the action'. If you take a look at issues of *Acorn User* around the time of the Electron launch (from mid-1983) you will see that it too got similar coverage.

We have several articles planned for future issues of the magazine, including a round-up of Electron hardware upgrades.

We are also keen to receive readers' software submissions for the Electron and will continue to support it as long as readers' interest remains.

DATABASE WISDOM

Sir, I read with interest Clive Williamson's *Overview* review 'Unity is Strength' in *Acorn User* (March 1988). In it he mentions a database manager – Minerva's *Delta* database – and compares it favourably with *ViewStore.*

Please could you answer two questions? Has *Acorn User* undertaken a recent survey of all databases for the BBC B – and if so, when?

H Allen
Middlesex

A round-up of databases including Minerva's *System Delta* database and *ViewStore* was featured in the June 1988 issue of *Acorn User.* Minerva Software, which produces *System Delta,* can be contacted at 69 Sidwell Street, Exeter, EX4 6PH; Tel. (0392) 37756.

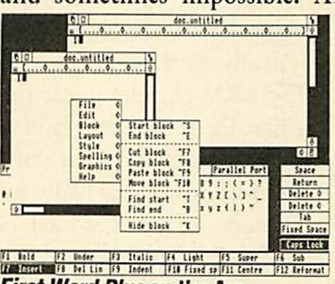
ARC CONVERSION

Sir, When I first used my Arc for wordprocessing only *Arcwriter* and *Graphic Writer* were available. The software had some early faults but, many users like myself had little alternative. I subsequently transferred many of my wordprocessing files from *View* and *Interword.*

I have now converted to the excellent *First Word Plus,* but am finding it impossible to load or read files from either *Arcwriter* or *Image Writer.* Perhaps someone could write an appropriate conversion program for a future edition of your magazine.

Dr N S Allen
Manchester

Transferring data between packages, especially ones produced by different companies, can be quite time-consuming and sometimes impossible. A



***First Word Plus* on the Arc**

lot of companies try to get around this by providing the capability to output the data to a file in ASCII format.

This effectively is then used as a standard data format. The major drawback with this method is that any formatting commands have to be stripped and you have to 'play around' with the text once it has been transferred.

The ideal solution is for each package to use the same (or at least have an option for) a standard data file structure that supports format commands such as margins and page length. BBC Soft has designed such a structure for the Archimedes. The standard is known as Uniform, and it will be employed in future Archimedes products such as *ArcWord.*

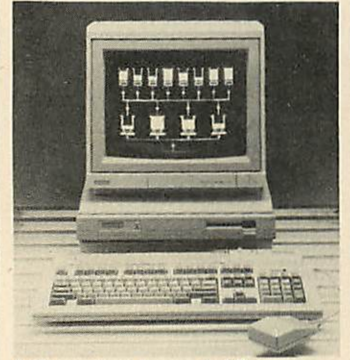
***Acorn User* hopes to cover Uniform for *First Word Plus* and *View* in the November 1988 issue.**

OUT OF TOUCH

Sir, I am an eighteen year old student, just finished A levels, and soon to begin an undergraduate course in Computer Science. I have been the (very) proud owner of an Archimedes 310 since March, bought on the pretence that it would be a superb upgrade from my BBC B of five years' standing, and that it would meet all my needs through my years at University and beyond. Unfortunately I feel that I, and all other Archimedes owners, have been very badly let down.

The ARM chip set inside the Archimedes is excellent and a credit to Acorn's research staff. But it is let down very badly by its system software, which is full of holes and plagued by bugs. While trying to write some code I have often come up against the Arthur 'Brick wall'. I am trying to write an 'advanced' colour painting package, along the lines of *Pixelpaint* on the Apple Macintosh II, and was banking on using the Arthur Window Manager to provide menus, palette windows, and such like but, after an afternoon of fruitless experimentation, I discovered that the system won't operate in 256 colour modes. While windows snap open, and menus appear, you can specify only colours in the range 0 to 15 for titles and scroll bars, as if you were in a sixteen-colour mode. In the 256 colour modes this limits you to a meagre selection of colours ranging from bright red, through green to a sickly yellow – the first sixteen colours don't contain any blue component. If I want to use windows I will have to write my own code. This is contrary to Acorn's wishes of standardising the user interface, but what can I do? Wait for Arthur 2?

The lack of standardised system software is soon (by the end of the year?) to be compounded by Computer Concepts' renegade operating system, which no doubt we will



Arthur not up to scratch?

have to pay for, if not directly then in the price of a backplane, ROM board, and eventually chips. Until a standard operating system is settled, we won't see any of the software the Archimedes truly deserves, and which would make it a clear winner in all markets.

Leaving aside the operating system, my tale of woe doesn't end there. Why is Archimedes software so expensive? After spending large amounts of money on the computer, monitor, printer and basic software I am now stuck. I have no money left with which to pursue the very subject I bought the computer for, namely writing software. I, myself, estimate that the minimum a serious Archimedes programmer requires is the ANSI C and ARM Assembler packages, and a text editor such as *Twin*. This little lot costs a mere £376.05. Add to this a toolkit module, the Programmer's Reference Manual, and the essential second disc drive (not to mention the ridiculous hard-disc price), and we're looking at some £500 extra just to start programming.

Every time I mention I have an Archimedes to other computer enthusiasts, I have to put up with sniggers behind hands and end up furiously defending a computer which I know is lame, and which I can really do nothing about. That is what they call consumer loyalty. If Acorn wants to kill the ARM and the Archimedes, it's going the right way about it. This cannot be shown more clearly than by the cancellation of the *Acorn User* show after Acorn apparently slammed on the brakes, ignoring their past customers in favour of a 'yuppie' professional show. It is clearly out of touch, and it's time it matched its software to the high standard set by the ARM chip set and really started selling the Archimedes as a serious player in the UK market – if it's not already too late.

William Charles
Middlesex

GREEN LIGHT FOR KERMIT

Sir, I was interested to read the letter from a reader in Norway in the July 1988 issue of *Acorn User* regarding the advantages of the KERMIT data transfer protocol. So far as I am aware this is the first time that *Acorn User* has drawn attention to this virtually universal protocol, which is now available in versions suitable for more than 100 different microcomputers and mainframes, including the Acorn BBC B and higher members of its family.

I am pleased to see that you intend to give further coverage to the KERMIT protocol in due course. In the meantime, readers might be interested to know that anyone with a disc drive and a simple scrolling terminal emulator (similar to the listing published in the June 1986 issue) can easily download the version they need from Lancaster University's free KERMIT distribution service, on (0524) 67671 or 67754. Both these lines have auto sense V21 (300 /300 baud) and V23 (1200/75 baud) modems. To log on, set your terminal for 8 bits, no parity, XON/XOFF flow control. Type CALL KERMIT ‹RETURN› when the PAD prompt is received in response to one or more ‹RETURN›, and enter KERMIT ‹RETURN› in response to each request for USERNAME and PASSWORD.

Full instructions can be obtained by responding to the menu displayed and CTRL–Y takes you back to the $ prompt. 'LOGOFF' allows you to exit. All files specific to BBC KERMIT have names of the type '.BBC *.*'. For example, information on obtaining, building and modifying BBC KERMIT can be obtained by typing 'TYPE .BBC BBC BUILD.HLP ‹RETURN›' in response to the general prompt.

Machine code programs can be downloaded by using one of either two files. BBCRAM .HEX is designed for use in main RAM while BBCROM.HEX is for use in sideways RAM or an EPROM.

Data is transmitted in blocks of 64 characters with a header containing a checksum, to avoid possible errors. A fairly simple conversion program (BBCDEHEX.BAS) is provided to restore them to their original form. It is advisable to subdivide the transmitted files, and to *SAVE the corresponding sections of code with addresses so that they will form a continuous sequence when *LOADed. The 100-page user guide (BBCKERMIT.DOC) must similarly be downloaded in sections.

Alan Reekie
Brussels

THE POSITIVE SIDE OF P2200

Sir, With reference to your *printer* review on page 112 of your August issue, I think your assessment of the NEC P2200 was unjust. I don't agree that from my experience of the P2200, the 'components seem flimsy, and wheels and levers feel as if they are too flexible'.

My most serious complaint, though, is that the P2200 does have more than one font available in letter quality mode. In fact it has five, with at least two different pitches available for each font.

J A Hoye
J-Soft

All our reviews reflect the personal opinion of the particular reviewer and we stand by what was said. For example, the paper-feeding mechanism does seem temperamental.

We were wrong though, in

```
Courier
ABC def 123 #%@

Super Focus
ABC def 123 #%@

OCR
ABC def 123 #%@

ITC Souvenir
ABC def 123 #%@

Prop Spc
ABC def 123 #%@
```

stating that the printer has only the one font. The P2200 does indeed have five, as can be seen above.

The review was not all negative though. We did state that of the four machines tested, the P2200 is 'by far the cheapest, offers good compatibility and is reasonable value for money'.

SWITCHED-ON SCHOOLS

Sir, Thank you for printing my letter in the August issue of *Acorn User*.

However, I have to say in all fairness that in my school at least, the teachers are taking a very open-minded approach and now CAT (computer-aided teaching) is playing a very wide role. French, German, Latin, CDT, English, Art and soon most other subjects will be reaping the benefits of the computer. This means that Computer Studies is becoming a powerhouse from which all the innovation and effort is coming, and the teachers should be congratulated on seeing the true benefits of the computer as what is needed in industry.

G Preston
Oxon

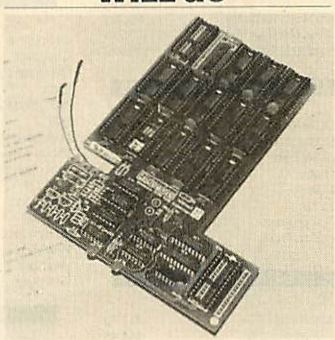
AGORA AGONY

Sir, I would never have believed it if I had not seen it with my own eyes. Yes, Amstrad has finally penetrated *Acorn User!* Not content with their rare appearances on the News page, an Amstrad disc — yes, one of those horrible 3-inch jobs — infiltrated Arc Agora in the July edition.

J N Abley
Bedford

Remember there are quite a few 3-inch drives on the back of BBCs. AMS first came to fame with them, and they can be used as direct replacements for 5.25- or 3.5-inch drives. However, as it was Agora, and the Arc comes with a 3.5-in drive, yes, it was a mistake. It does illustrate a point about standards – some formerly well-supported ones die out. Like Betamax video, 3-inch discs have gone, leaving only the 3.5-inch standard.

TWO INTO ONE WILL GO



ATPL sideways ROM board

Sir, I wish to upgrade my disc system from an Opus DDOS to an ADFS and single-density system. It seems that the best way to do this would be to buy the new Watford DFS and an Acorn ADFS ROM, but I am worried that this will take up a large amount of memory. Could you tell me just how much memory it will occupy and whether it would be possible to use sideways RAM as disc workspace?

Secondly, I have an ATPL ROM board with 16k SWR. Is it possible to upgrade this with a 32k RAM chip or will I have to buy a second processor for more memory?

D McQueen
Cardiff

Using both DFS and ADFS in a BBC model B does inevitably use up more memory than either of them on their own, and with these ROMs you can't use any sideways RAM as workspace. To do this would mean altering the ROMs substantially. With both filing systems, you'll find the value of PAGE at &1F00, or higher if you have other ROMs that claim memory.

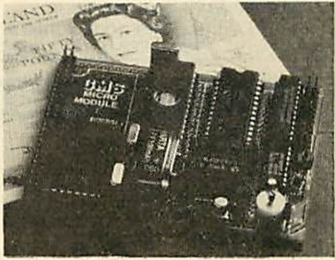
HOME-MADE MOUSE

Sir, I recently attended the IEE Micromouse contest. These are small maze-solving buggies controlled and guided by an on-board micro. After talking to people at the show, I've decided to try my hand at building my own mouse.

The first problem to solve is which computer to use. The most popular systems are based around the Z80 processor, usually old ZX80/ZX81s with their keyboards removed. As a BBC user, a 6502 machine would be more appropriate, although the only controller cards I can find use Z80 and 8052 processors. Do you know of any 6502-based cards or even a suitable circuit diagram?

Andy McClements
London

The BBC micro is actually available in miniature on a 3U Eurocard. The card is called the Euro-Microbeeb and can be attached to any type of computer for programming. The unit can then be run as a stand-alone micro. A range of inputs and outputs are present, with a real-time clock and battery-backed RAM. BBC Basic, Forth, Pascal, 6502



Mini-Beeb on a card

machine code and assembler are all supported. The card is supplied by Cambridge Microprocessor Systems, Brookfield Business Centre, Twentypence Road, Cottenham, Cambridge CB4 4PS.

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South East Essex. BBC User Group (SEEBUG): Mr A P Jordan, 97 Oakhurst Drive, Wickford, Essex SS12 ONW Tel: Rayleigh 771428
Sutton. Sutton Library Computer Group: The Secretary, 21 Village Row, Sutton, Surrey SM2 6JZ Tel: 01-642 3102
Welling. Computer Users Club: Tony Latham, 69 Hadlow Road, Welling, Kent DA16 1AX
JP101 User Group: c/o 8 Cherry Gdns, Billericay, Essex CM12 OHA
St Albans. RISC User (for Arc Users): c/o Dolphin Place, Holywell Hill, St Albans, Herts, Al1 1EX Tel: (0727) 40303

SOUTH & SOUTH-WEST

Fareham. Porchester & Fareham Computer Club: Michael Archer, 113 Deerhurst Crescent, Paulsgrove, Portsmouth, Hampshire PO6 4EJ Tel: (0705) 325647

MIDLANDS & ANGLIA

Birmingham. The Midland Amateur Radio Society BBC User Group: M Nyman, Unit 16,60 Regent Place, Off Caroline St, Birmingham 1 Tel: 021-382 3606
Boston. Boston Acorn Computer Users Group: J C Goodwin, 245 Church Green Road, Fishloft, Boston, Lincs PE21 ORP
Burton-on-Trent. Beeb Users Group (Bug Club): Mrs Linda Yeomans, 13 Regent St, Church Gresley, Burton-on-Trent, Staffs DE11 9PL Tel: (0283) 216445 (eves)
Cambridge. Bottisham Acorn User Group: Gerald Wilcockson, 19 Gallows Hill, Saffron Walden, Essex CB11 4DA Tel: Saffron Walden 23793
Derby. Derby Microcomputer Society: Mrs Beverley Bowman, 6 Shady Grove, Hilton, Derbyshire DE6 5FX
Dudley. Kingswinford BBC Micro Club: Kingswinford Community Centre, High Street, Kingswinford, Dudley, West Midlands
Glossop. Glossop Computer Club (Derbyshire): T S Fox, 4 Park Lane, Little Hayfield, Stockport, Cheshire SK12 5NW Tel: (0663) 44260
Huntingdon. RAF Personal Computer Association: Sgn Ldr J A Upham, Man S (ADP), HQ RAFSC, RAF Brampton, Huntingdon PE18 8QL
Norwich. Amateur Computer Club: Andy Leeder, Church Farm, Stratton St Michael, Norwich NR15 2QB
Norwich. Norwich and District BBC Microcomputer User Group: Roy Street, Church Farmhouse, Temelthorpe, Dareham, Norfolk NR15 2QB Tel: Foulsham 579
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Stoke. POTBUG BBC User Group: J Forest, 50 Cliff St, Smallthorne, Stoke-on-Trent, Staffs Tel: 818430
Stratford. Stratford Computer Club: E Sheppard, 35 Sidelands Rd, Stratford-on-Avon, Warwickshire CV37 9DT
Suffolk. West Suffolk BBC Micro Users Club: Mike Holland, 14 Plovers Way, Bury St Edmunds, Suffolk AP33 2NJ Tel: (0284) 4853
Suffolk. Gateway Computer Club: Phil Herberer, 164d Radcliffe Road, Lakenheath, Suffolk Tel: Eriswell 2363

NORTH-WEST

Blackburn. Blackburn Acorn User Domain: c/o Yuticks Nest, Pringle St, Blackburn, Lancs Tel: (0254) 55578
Cheshire. Mid-Cheshire Computer Club: Michael Christie, 496 The High St, Winsford, Cheshire
Cumbria. West Cumbria User Group: P Majid Tel: (0946) 62732, or K Purkiss, Tel: (0946) 66586
Liverpool. Mersey BBC User Group: Nik Kelly, 56 Queens Drive, Liverpool L4 6SH
Rochdale. Rochdale's Beeb Owners Group: P Halliwell 81 Mornington Road, Kirkholt, Rochdale, Lancs OL11 2OJ
St Helens. SNUG (Special Needs User Group): J Hughes, 39 Eccleston Gardens, St Helens WA10 3BJ Tel: (0744) 24608
Wirral. Wirral Micro Users Group: David Walsh, 23 The Pines, Spital Road, Bebington, Wirral L63 9PH

NORTH-EAST

Huddersfield. Huddersfield BBC Micro User Group: S Gill, 21 Mayfair Ave, Sowood, Halifax, West Yorkshire Tel: (0422) 73058
Hull. Forum 80: 421 Endike Lane, Hull HU6 8AG
Hull. MUSE (for teachers): PO Box 43,231/2 Friary Chambers, Whitefriargate, Hull HU1 2HD Tel: (0428) 20268
Leeds. Garforth BBC User Group (Garbug): Mr D G Bell, 84 Park Lane, Rothwell, Leeds LS26 OEY
Keighley. Keighley Computer Club: Colin Price, "Apple Garth", The Hobb Hill, Chapel Road, Steeton, Keighley, West Yorkshire Tel: (0535) 54738
Newcastle. Newcastle & Washington BBC User Group (NEWBUG): Multi Purpose Centre, Oxclose Village, Washington, Tyne & Wear Tel: 091-4166407
Newcastle. BIAC (BBC IBM Amstrad and Compatibles user group): N Kidd, Multi Purpose Centre, Oxclose Village, Washington, Tyne & Wear Tel: 091-4166407
Northumbria. Northumbria Electronics and BBC Micro Users Group (NEBUG): Ian Douglas Chapman, 13 Pont St, Ashington, Northumberland NE63 OHH
Sheffield. Parsons Cross BBC User Group: Andrew Grant, 28 Rokeby Road, Sheffield S5 9FU Tel (0742) 461203
Sheffield. Acorn and BBC User Group (ABUG): Mick Cattell (Sec) 128 Greenhill Avenue, Sheffield S8 7TF Tel: (0742) 745209
South Yorkshire. South Yorkshire Personal Computer Group: Bob Hindle, 139 Penrhyn Road, Sheffield S11 8UP
Wakefield. Wakefield BBC Micro User Group: PO Box 65 Wakefield, West Yorks WF2 6YZ

SCOTLAND

Central Scotland. BBC User Group: D Davidson, 2 Akarit Road, Larbert, Stirlingshire FK5 4BY (Tel (0324) 558692
Central Scotland. Archimedes User Group (ScotArc): D Davidson, 2 Akarit Road, Larbert, Stirlingshire FK5 4BY
Econet User Group (Scotland): c/o Michael Ryan, Balkeerie Cottage, Eassie by Forfar, Angus, Scotland.
Inverclyde. Inverclyde BBC Micro Users Club: Robert Watt, 38 Wellyard Way, Greenock, Renfrewshire PA16 OXG Tel: Gourock 39967

WALES

Cardiff. Cardiff BBC Computer Club: Geoffrey Barker, 2 Whitecliffe Drive, Penarth CF6 2RY Tel: (0222) 701023

N. IRELAND

Belfast. Belfast Computer Club: Andrew White, 19 Greenpark Drive, Markethill, Co. Armagh BT60 1PX

OVERSEAS

Australia. BBC Users Group of Canberra: PO Box E58, Queen Victoria Terrace, ACT 2600
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Australia. Ozbeeb Sydney (meetings North Ryde): PO Box 1030, Parramatta 2150 Tel: 635 4868 (day) or 868 4455 (eve)
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MASTER 128, £290. Pace 5.25-in single disc drive, £50. Tel: Pangbourne (07357) 4450.

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WANTED RQ-Forth (disc version) RQ-Toolkit, also G-Forth (disc version) plus manuals. Campbell, "Melrose", Station Road, Ellon, Aberdeen. Tel: (0358) 20226.

WANTED *QuickShot II* joystick for BBC B, also the monthly tape from November 1987 edition of *Micro User*. Tel: (0554) 758804.

WANTED! computer users interested in graphics to start new group: John Catchpole, 5 Carters Leys, Bishop's Stortford, Herts. CM23 2RH.

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ACORN USER'S

DIARY

Praise from Wellington

We try our hardest to make sure that *Acorn User* comes out as one of the best computer magazines in the world, but it's not often that we manage to get reviewed.

So it was great to be sent a clipping from the Wellington newspaper *The Dominion* by Patrick Carr in New Zealand.

Nine leading micro titles were reviewed recently from both Britain and America (even *Byte* was reviewed), and *Acorn User* came out really well.

To quote computer editor Bill Bennett, *Acorn User* is '. . . the epitome of a specialist computer magazine. . . news pages particularly good . . . manages to combine style with content.'

We could, of course, go on like this for a whole page, but we'll end modestly with our friend Bill's final paragraph: 'I feel the editorial mix is excellent, and, at $6.95, *Acorn User* is good value.'

Acorn User

BIG and glossy and dedicated to users of Acorn's range of home and personal computers, Acorn User is the epitome of a specialist computer magazine.

There are other titles aimed at the same market, in particular the Micro User, but for my money Acorn User serves its target audience better than its competition.

Acorn User has an interesting pedigree. It is owned by Redwood Publishing, a company started by Arcon founder Chris Curry. In my opinion, this does little to interfere with the magazine's integrity.

The news pages are particularly good for a specialist title and Acorn User wisely includes a lot of strong material dealing with education — an important issue with most owners of Acorn's BBC micro.

New Zealanders who own Acorn computers will like the mail order advertisements liberally sprinkled through the pages of the journal.

I am always a sucker for good graphics and stylish presentation, which Acorn User has in lavish quantities. But Acorn User manages to combine style with content.

There are lots of articles about things to do with your Acorn computer — and that includes the amazing Archimedes.

I feel that the editorial mix is excellent and, at $6.95 for 170 pages, Acorn User is good value.

The Dominion, June 27



Just when we thought it was the end of the road for Tim Tyler's reptile, it turns out Repton's set to pop up on the Arc! In the meantime, this is the way to go.

Arthur smiles on Liza and Dudley

FIRST NIGHT SUCCESS: Dudley Moore and Liza Minnelli throw a star-studded party in Los Angeles, following the showing of their new comedy Arthur 2 On The Rocks which will go on release nationwide in two weeks.

Time for another cutting, this one about Arthur 2 on the rocks. No, it's not from *Computer Guardian*, in fact it was the *London Standard* on June 23.

■ Commiserations to our very own Nick Evans who's been flat on his back for the past couple of months.

No, it's not the drink, but a back strain from lifting his Z88 (or so he says).

■ Postscript to July's news story about the go-faster Acorn rep on the road between Clitheroe and Accrington. He was acquitted of speeding because it turned out he wasn't going fast enough.

Next month — a history of Acorn

The History of Acorn is one of the major features in October. We've dug into the archives and spoken to the Acorn originals to present the ups and downs of one of the world's most innovative computer companies.

It's a blistering read, and one we'd like readers to contribute to, so send us in your stories of Acorn. Who's got the earliest model A and B – or System 1 come to that? Who answered your technical queries back in 1982? If you've got a tale to tell, write to History of Acorn, *Acorn User*, 20-26 Brunswick Place, London N1 6DJ.

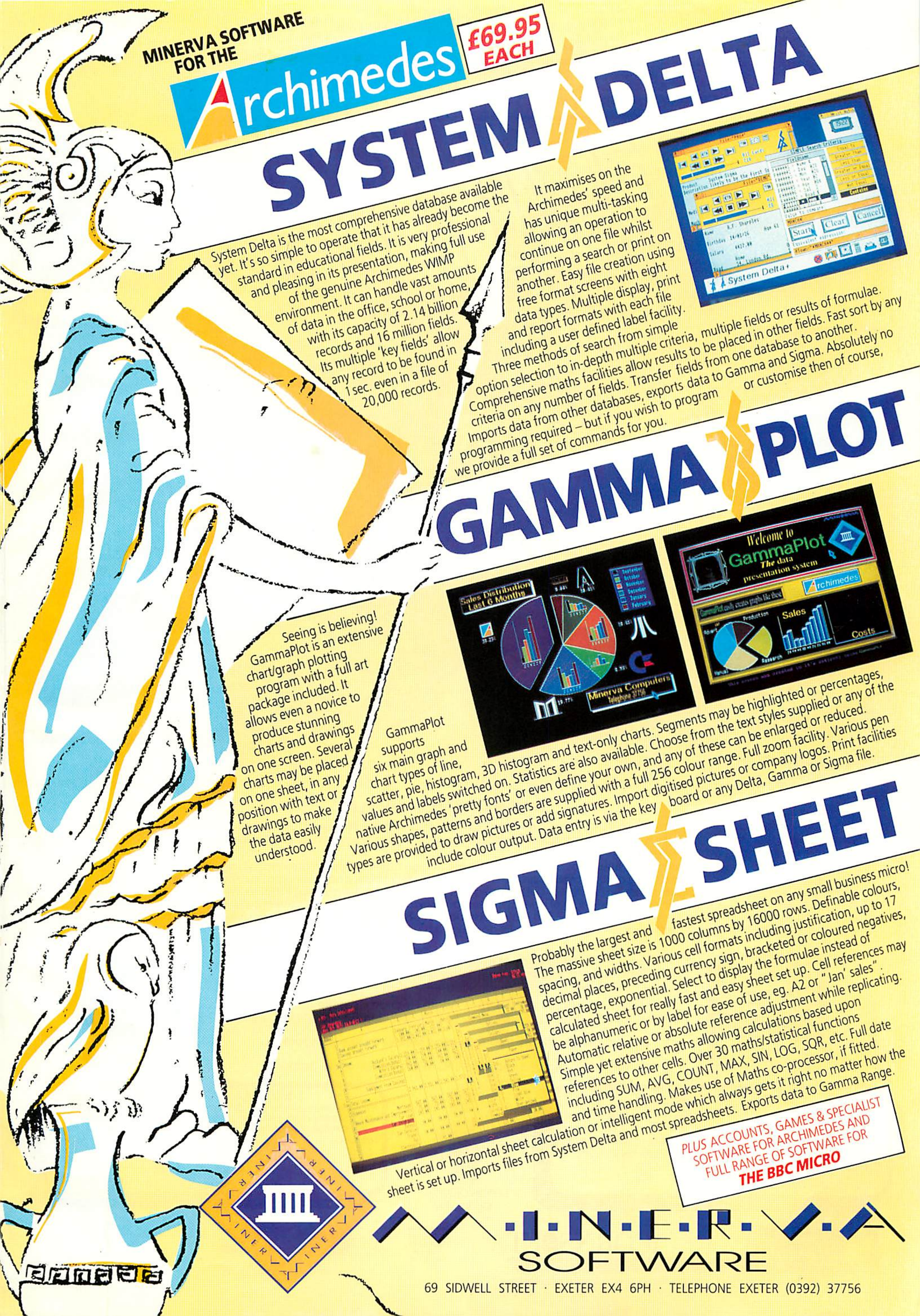
Also, Joe Telford comes up with a thought processor to help you organise your ideas. And Peter Voke continues our adventure theme with his IMAGINE adventure generator.

For Arc owners we've got the third part of Chris Adie's article on the menu system with a built-in treatise on object-oriented programming (if you're not into that, just type in the listing).

PHOTOGRAPH BY DR DAVID LAWRENCE



Hermann Hauser and Chris Curry in the early days at Acorn



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The screen pictures show the BBC Micro version of the game.



THE CHARACTER EDITOR

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(This does not affect your statutory rights)